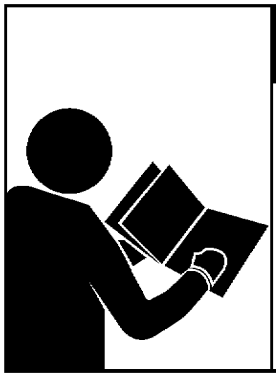
RELIANCE®
WATER HEATER COMPANY

FVIR GAS WATER HEATER

(FLAMMABLE VAPOR IGNITION RESISTANT)

FOR POTABLE WATER HEATING ONLY.
NOT FOR USE IN MOBILE HOMES.

This water heater complies with ANSI Z21.10.1-current edition regarding the accidental or unintended ignition of flammable vapors, such as those emitted by gasoline.



⚠WARNING

Read and understand instruction manual and safety messages before installing, operating or servicing this water heater.

Failure to follow instructions and safety messages could result in death or serious injury.

Instruction manual must remain with water heater.

- **Safety Instructions**
- **Installation**
- **Operation**
- **Care and Maintenance**
- **Troubleshooting**
- **Parts List**

INSTALLER:

- AFFIX THESE INSTRUCTIONS TO OR ADJACENT TO THE WATER HEATER.

OWNER:

- RETAIN THESE INSTRUCTIONS AND WARRANTY FOR FUTURE REFERENCE. RETAIN THE ORIGINAL RECEIPT AS PROOF OF PURCHASE.

WARNING: Gas leaks can not always be detected by smell.

Gas suppliers recommend that you use a gas detector approved by UL or CSA.

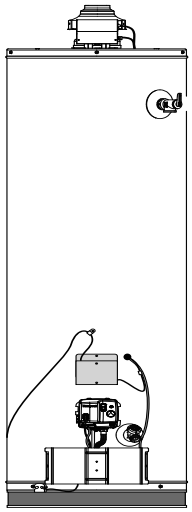
For more information, contact the your gas supplier.

If a gas leak is detected, follow the "WHAT TO DO IF YOU SMELL GAS" instructions.

ENERGY STAR

DESIGN CERTIFIED

LOW LEAD COMPLIANT



For Your Safety

AN ODORANT IS ADDED TO THE GAS USED BY THIS WATER HEATER.

WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

— Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

— WHAT TO DO IF YOU SMELL GAS

- **Do not try to light any appliance.**
- **Do not touch any electrical switch; do not use any phone in your building.**
- **Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.**
- **If you cannot reach your gas supplier, call the fire department.**

— Installation and service must be performed by a qualified installer, service agency or the gas supplier.

ALL TECHNICAL AND WARRANTY QUESTIONS: SHOULD BE DIRECTED TO THE LOCAL DEALER FROM WHOM THE WATER HEATER WAS PURCHASED. IF YOU ARE UNSUCCESSFUL, CONTACT RESIDENTIAL TECHNICAL ASSISTANCE AT 1-800-365-4054 OR WWW.RELIANCEWATERHEATERS.COM.

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SAFE INSTALLATION, USE AND SERVICE

Your safety and the safety of others is extremely important in the installation, use and servicing of this water heater.

Many safety-related messages and instructions have been provided in this manual and on your water heater to warn you and others of a potential hazard. Read and obey all safety messages and instructions throughout this manual. It is very important that the meaning of each safety message is understood by you and others who install, use or service this water heater.

⚠	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or injury.
⚠ CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION	CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in property damage

All safety messages will generally tell you about the type of hazard, what can happen if you do not follow the safety message and how to avoid the risk of injury.

Do not use this appliance if any part has been under water. Immediately call a qualified person. Water heaters subjected to flood conditions or any time the gas controls, main burner or pilot have been submerged in water require replacement of the entire water heater.

The California Safe Drinking Water and Toxic Enforcement Act requires the Governor of California to publish a list of substances known to the State of California to cause cancer, birth defects, or other reproductive harm, and requires businesses to warn of potential exposure to such substances.

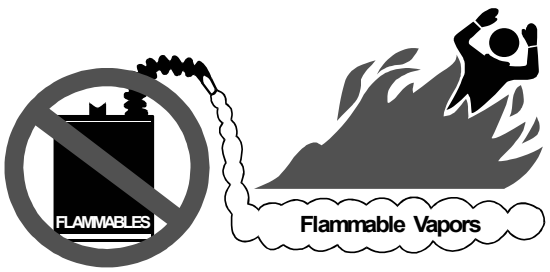
WARNING: This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

This appliance can cause low-level exposure to some of the substances included in the Act.

IMPORTANT DEFINITIONS

- **Qualified Technician:** A qualified technician must have ability equivalent to a licensed tradesman in the fields of plumbing, air supply, venting, and gas supply, including a thorough understanding of the requirements of the National Fuel Gas Code as it relates to the installation of gas fired water heaters. The qualified technician must also be familiar with the design features and use of flammable vapor ignition resistant water heaters, and have a thorough understanding of this instruction manual.
- **Service Agency:** A service agency also must have ability equivalent to a licensed tradesman in the fields of plumbing, air supply, venting and gas supply, including a thorough understanding of the requirements of the National Fuel Gas Code as it relates to the installation of gas fired water heaters. The service agency must also have a thorough understanding of this instruction manual, and be able to perform repairs strictly in accordance with the service guidelines provided by the manufacturer.
- **Gas Supplier:** The Natural Gas or Propane Utility or service who supplies gas for utilization by the gas burning appliances within this application. The gas supplier typically has responsibility for the inspection and code approval of gas piping up to and including the Natural Gas meter or Propane storage tank of a building. Many gas suppliers also offer service and inspection of appliances within the building.

SAFETY PRECAUTIONS



⚠ WARNING

FIRE AND EXPLOSION HAZARD

Can result in serious injury or death

⚠ Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. Storage of or use of gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance can result in serious injury or death.

Read and follow water heater warnings and instructions.

⚠ WARNING

Read and understand instruction manual and safety messages before installing, operating or servicing this water heater.

Failure to follow instructions and safety messages could result in death or serious injury.

Instruction manual must remain with water heater.

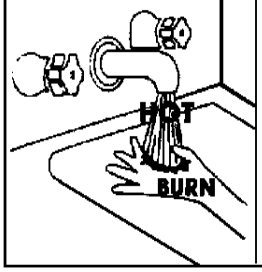
⚠ WARNING

Fire Hazard

For continued protection against risk of fire:

- Do not install water heater on carpeted floor.
- Do not operate water heater if flood damaged.

⚠ DANGER



Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

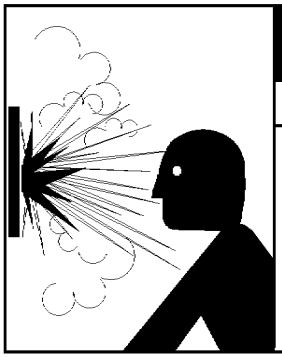
Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

⚠ WARNING



Explosion Hazard

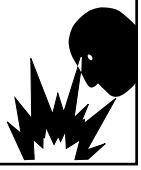
- Overheated water can cause water tank explosion.
- Properly sized temperature and pressure relief valve must be installed in opening provided.

⚠ WARNING

Fire or Explosion Harzard

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Avoid all ignition sources if you smell Natural or LP gas.
- Do not expose water heater control to excessive gas pressure.
- Use only gas shown on rating plate.
- Maintain required clearances to combustibles.
- Keep ignition sources away from faucets after extended period of non-use.

Read instruction manual before installing, using or servicing water heater.



⚠ WARNING

Breathing Hazard - Carbon Monoxide Gas

- Install vent system in accordance with codes.
- Do not operate water heater if flood damaged.
- High altitude orifice must be installed for operation above 7,700 feet (2,347m).
- Do not operate if soot is present.
- Do not obstruct water heater air intake with insulating jacket.
- Do not place chemical vapor emitting products near water heater.
- Gas and carbon monoxide detectors are available.

Breathing carbon monoxide can cause brain damage or death. Always read and understand instruction manual.

CAUTION

Improper installation and use may result in property damage.

- Do not operate water heater if flood damaged.
- Inspect and replace anode.
- Install in location with drainage.
- Fill tank with water before operation.
- Be alert for thermal expansion.

Refer to instruction manual for installation and service.

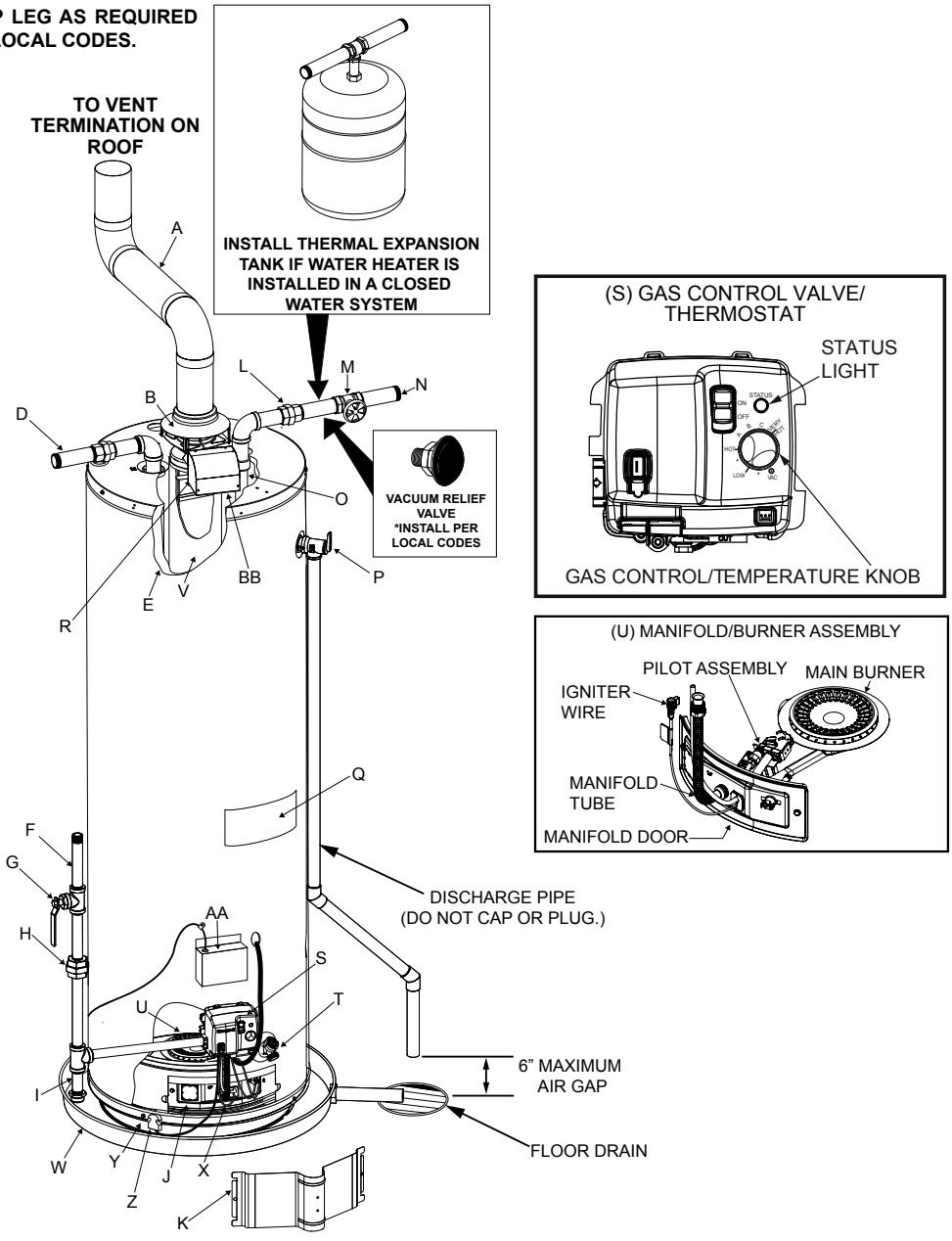
TYPICAL INSTALLATION

GET TO KNOW YOUR WATER HEATER - GAS MODELS

A Vent Pipe
B Draft Hood
C Anode (Not Shown)
D Hot Water Outlet
E Insulation
F Gas Supply Piping
G Manual Gas Shut-off Valve
H Ground Joint Union
I Drip Leg (Sediment Trap)
J Inner Door
K Outer Door
L Union
M Inlet Water Shut-off Valve
N Cold Water Inlet
O Inlet Dip Tube
P Temperature-Pressure Relief Valve
Q Rating Plate
R Flue Baffle
S Gas Control Valve/Thermostat
T Drain Valve
U Pilot and Main Burner
V Flue
W Metal Drain Pan
X Igniter Wire
Y Base-Ring Filter
Z FV Sensor
AA Transformer
BB Flue Damper

*** INSTALL IN ACCORDANCE WITH LOCAL CODES.**

*** DRIP LEG AS REQUIRED BY LOCAL CODES.**



*** ALL PIPING MATERIALS TO BE SUPPLIED BY CUSTOMERS.**

NOTE: POWER CORD NOT SHOWN FOR CLARITY

INSTALLING YOUR GAS WATER HEATER

Important Information About This Water Heater

This gas water heater was manufactured to voluntary safety standards to reduce the likelihood of a flammable vapor ignition incident. New technology used in meeting these standards makes this product more sensitive to installation errors or improper installation environments. Please review the Installation Checklist found at the end of the installation instructions section and make any required installation upgrades or changes.

Consumer Information

This water heater is design-certified by CSA International as a Category I, non-direct vented water heater which takes its combustion air either from the installation area or from air ducted to the unit from the outside.

This water heater must be installed according to all local and state codes or, in the absence of local and state codes, the “National Fuel Gas Code”, ANSI Z223.1(NFPA 54)-current edition. This is available from the following:

CSA America, Inc.
8501 East Pleasant Valley Road
Cleveland, OH 44131

National Fire Protection Agency
1 Batterymarch Park
Quincy, MA 02269

Check your phone listings for the local authorities having jurisdiction over your installation.

Consumer Responsibilities

This manual has been prepared to acquaint you with the installation, operation, and maintenance of your gas water heater and provide important safety information in these areas.

Read all of the instructions thoroughly before attempting the installation or operation of this water heater.

Do not discard this manual. You or future users of this water heater will need it for future reference.

Service to the FVIR System should only be performed by a qualified technician.

Examples of a qualified technician include: licensed plumbers, authorized gas company personnel, and authorized service personnel.

IMPORTANT: The manufacturer and seller of this water heater will not be liable for any damages, injuries, or deaths caused by failure to comply with the installation and operating instructions outlined in this manual.

If you lack the necessary skills required to properly install this water heater, or you have difficulty following the instructions, you should not proceed but have a qualified technician perform the installation of this water heater. Massachusetts code requires this water heater to be installed in accordance with Massachusetts Plumbing and Fuel Gas Code 248 CMR Section 2.00 and 5.00.

A rating plate identifying your water heater can be found on the front of your water heater. When referring to your water heater, always have the information listed on the rating plate readily available. Retain your original receipt as proof of purchase.

Unpacking the Water Heater

⚠ WARNING

Excessive Weight Hazard

Use two or more people to move and install the water heater.

Failure to do so can result in injury (including back injury).

IMPORTANT: Do not remove any permanent instructions, labels, or the data label from either the outside of the water heater or on the inside of water heater panels.

- Remove exterior packaging and place installation components aside.
- Inspect all parts for damage prior to installation and start-up.
- Completely read all instructions before attempting to assemble and install this product.
- After installation, dispose of/recycle all packaging materials.

Location Requirements

⚠ WARNING

Carbon Monoxide Poisoning Hazard

Do not install in a mobile home.

Doing so can result in carbon monoxide poisoning and death.

The Flammable Vapor (FV) Sensor is designed to reduce the risk of flammable vapor-related fires. Flammable liquids (such as gasoline, solvents, propane, etc,) emit flammable vapors which can be ignited by a gas water heater’s spark igniter or main burner. The resulting flashback and fire can cause death or serious burns to anyone in the area.

This heater is equipped with an FV sensor for detecting the presence of flammable vapors. When the sensor detects those vapors, the unit will shut down and not operate. Should this happen, please refer to the troubleshooting guide. Even though this water heater is a flammable vapors ignition resistant water heater and is designed to reduce the chances of flammable vapors being ignited, gasoline and other flammable substances should never be stored or used in the same vicinity or area containing a gas water heater or other open flame or spark producing appliance. In the event the FV Sensor does not prevent the ignition of flammable vapors, the FVIR System is designed to reduce the risk of flammable vapor-related fires.

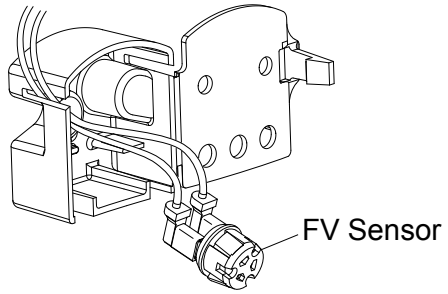
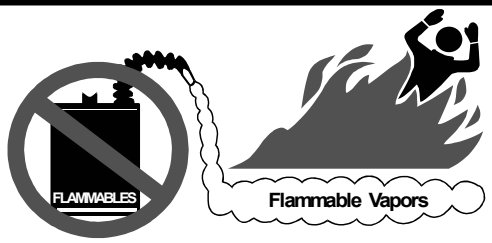


FIGURE 1.

The patented system protects your family by trapping the burning vapors within the water heater combustion chamber through the special flame-arrestor. The burning vapors literally “burn themselves out” without escaping back into the room. In the event of a flammable vapor incident, the FVIR System disables the water heater by shutting off the gas supply to the water heater’s burner and pilot, preventing re-ignition of any remaining flammable vapors in the area. This will not prevent a possible fire/ explosion if the igniter activates and flammable vapors have accumulated in the combustion chamber with the pilot light off. If you suspect a flammable vapor incident has occurred, do not use this appliance. Do not attempt to light this appliance, if you suspect flammable vapors have accumulated inside or outside the appliance. Immediately call a qualified technician to inspect the appliance. Water heaters subjected to a flammable vapors incident will show a discoloration on the flame-arrestor and require replacement of the entire water heater.

⚠ WARNING



FIRE AND EXPLOSION HAZARD

Can result in serious injury or death

⚠ Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. Storage of or use of gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance can result in serious injury or death.

Read and follow water heater warnings and instructions

Do not use or store flammable products such as gasoline, solvents, or adhesives in the same room or area near the water heater. If such flammables must be used, all gas burning appliances in the vicinity must be shut off and their pilot lights extinguished. Open the doors and windows for ventilation while flammable substances are in use.

If flammable liquids or vapors have spilled or leaked in the area of the water heater, leave the area immediately and call the fire department from a neighbor’s home. Do not attempt to clean the spill until all ignition sources have been extinguished.

⚠ WARNING

Fire or Explosion Hazard

- **Read instruction manual before installing, using or servicing water heater.**
- **Improper use may result in fire or explosion.**
- **Maintain required clearances to combustibles.**

Keep combustibles such as boxes, magazines, clothes, etc. away from the water heater area.

Site Location

- Select a location near the center of the water piping system. The water heater must be installed indoors and in a vertical position on a level surface. DO NOT install in bathrooms, bedrooms, or any occupied room normally kept closed.
- Locate the water heater as close to the chimney or gas vent as practical. Consider the vent system piping and combustion air supply requirements when selecting the water heater location. The venting system must be able to run from the water heater to termination with minimal length and elbows.
- Locate the water heater near the existing gas piping. If installing a new gas line, locate the water heater to minimize the pipe length and elbows.
- The water heater should be located in an area not subject to freezing temperatures. Water heaters located in unconditioned spaces (i.e., attics, basements, etc.) may require insulation of the water piping and drain piping to protect against freezing. The drain and controls must be easily accessible for operation and service. Maintain proper clearances as specified on the rating plate.
- Do not locate the water heater near an air-moving device. The operation of air-moving devices such as exhaust fans, ventilation systems, clothes dryers, fireplaces, etc., can affect the proper operation of the water heater. Special attention must be given to conditions these devices may create. Flow reversal of flue gases may cause an increase of carbon monoxide inside of the dwelling (Figure 1).
- If the water heater is located in an area that is subjected to lint and dirt, it may be necessary to periodically clean the base-ring filter and flame-arrestor (see External Inspection & Cleaning of the Flame-arrestor).

NOTE: This water heater must be installed according to all local and state codes or, in the absence of local and state codes, the “National Fuel Gas Code”, ANSI Z223.1(NFPA 54)-current edition.

CAUTION

Property Damage Hazard

- All water heaters eventually leak
- Do not install without adequate drainage.

IMPORTANT: The water heater should be located in an area where leakage of the tank or connections will not result in damage to the area adjacent to the water heater or to lower floors of the structure. Due to the normal corrosive action of water, the tank will eventually leak after an extended period of time. Also any external plumbing leak, including those from improper installation, may cause early failure of the tank due to corrosion if not repaired. If the homeowner is uncomfortable with making the repair a qualified technician should be contacted. A suitable metal drain pan should be installed under the water heater as shown below, to help protect the property from damage which may occur from condensate formation or leaks in the piping connections or tank. The pan must limit the water level to a maximum depth of 1-3/4" and be two inches wider than the heater and piped to an adequate drain. NOTE: The pan must not restrict combustion air flow. Locate the water heater near a suitable indoor drain. Outside drains are subject to freezing temperatures which can obstruct the drain line. The piping should be at least 3/4" ID and pitched for proper drainage.

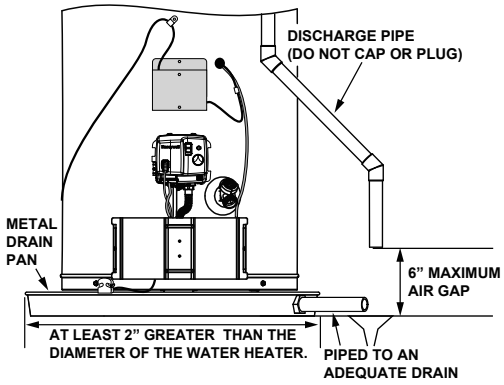


FIGURE 2.

Water heater life depends upon water quality, water usage, water temperature and the environment in which the water heater is installed. Water heaters are sometimes installed in locations where leakage may result in property damage, even with the use of a metal drain pan piped to a drain. However, unanticipated damage can be reduced or prevented by a leak detector or water shut-off device used in conjunction with a piped metal drain pan. These devices are available from some plumbing supply wholesalers and retailers, and detect and react to leakage in various ways:

- Sensors mounted in the drain pan that trigger an alarm or turn off the incoming water to the water heater when water is detected.
- Sensors mounted in the drain pan that turn off the water supply to the entire home when water is detected in the drain pan.
- Water supply shut-off devices that activate based on the water pressure differential between the cold water and hot water pipes connected to the water heater.
- Devices that will turn off the gas supply to a gas water heater while at the same time shutting off its water supply.

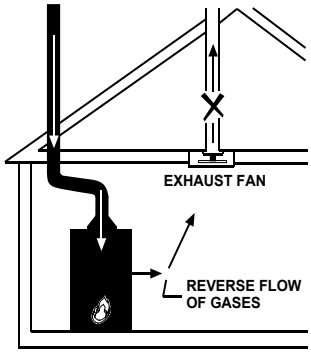


FIGURE 3.

Clearances and Accessibility

NOTE: Minimum clearances from combustible surfaces are stated on the rating plate adjacent to the gas control valve/ thermostat of the water heater.

The water heater is certified for installation on a combustible floor.

- IMPORTANT: If installing over carpeting, the carpeting must be protected by a metal or wood panel beneath the water heater. The protective panel must extend beyond the full width and depth of the water heater by at least three inches (76.2mm) in any direction; or if in an alcove or closet installation, the entire floor must be covered by the panel.
- Figure 4 may be used as a reference guide to locate the specific clearance locations. A minimum of 24 inches of front clearance should be provided for inspection and service.

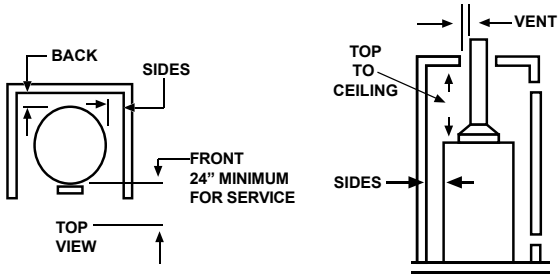


FIGURE 4.

State of California

NOTE: The water heater must be braced, anchored, or strapped to avoid moving during an earthquake. Contact local utilities for code requirements in your area, visit http://www.dsa.dgs.ca.gov, or call 1-916-445-8100 and request instructions.

GAS SUPPLY

⚠ WARNING

Explosion Hazard

- **Use a new CSA approved gas supply line.**
- **Install a shut-off valve.**
- **Do not connect a natural gas water heater to an L.P. gas supply.**
- **Do not connect an L.P. gas water heater to a natural gas supply.**
- **Failure to follow these instructions can result in death, explosion, or carbon monoxide poisoning.**

Gas Requirements

IMPORTANT: Read the rating plate to be sure the water heater is made for the type of gas you will be using in your home. This information will be found on the rating plate located near the gas control valve/thermostat. If the information does not agree with the type of gas available, do not install or light. Call your dealer.

NOTE: An odorant is added by the gas supplier to the gas used by this water heater. This odorant may fade over an extended period of time. Do not depend upon this odorant as an indication of leaking gas.

Gas Piping

The gas piping must be installed according to all local and state codes or, in the absence of local and state codes, the "National Fuel Gas Code", ANSI Z223.1(NFPA 54)-current edition.

Tables 1 and 2 on the following page provide a sizing reference for commonly used gas pipe materials. Consult the "National Fuel Gas Code" for the recommended gas pipe size of other materials.

NOTE: Use pipe joint compound or teflon tape marked as being resistant to the action of petroleum [Propane (L.P.)] gases (See Figure 5.)

1. Install a readily accessible manual shut-off valve in the gas supply line as recommended by the local utility. Know the location of this valve and how to turn off the gas to this unit.
2. Install a drip leg (if not already incorporated as part of the water heater) as shown. The drip leg must be no less than three inches long for the accumulation of dirt, foreign material, and water droplets.
3. Install a ground joint union between the gas control valve/thermostat and the manual shut-off valve. This is to allow easy removal of the gas control valve/ thermostat.
4. Turn the gas supply on and check for leaks. Test all connections by brushing on an approved noncorrosive leak-detection solution. Bubbles will show a leak. Correct any leak found.

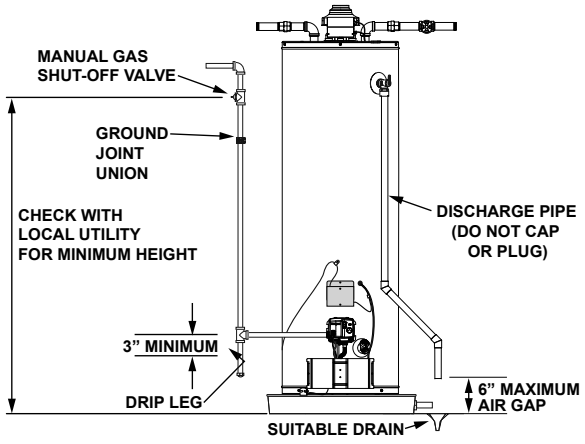


FIGURE 5.

Gas Pressure

⚠ WARNING

Explosion Hazard

- **Gas leaks can not always be detected by smell.**
- **Gas suppliers recommend that you use a gas detector approved by UL or CSA.**
- **For more information, contact your gas supplier.**
- **If a gas leak is detected, follow the "What to do if you smell gas" instructions on the cover of this manual.**

IMPORTANT: The gas supply pressure must not exceed the maximum supply pressure as stated on the water heater's rating plate. The minimum supply pressure is for the purpose of input adjustment.

Gas Pressure Testing

IMPORTANT: This water heater and its gas connection must be leak tested before placing the appliance in operation.

- If the code requires the gas lines to be tested at a pressure exceeding 14" W.C., the water heater and its manual shut-off valve must be disconnected from the gas supply piping system and the line capped.
- If the gas lines are to be tested at a pressure less than 14" W.C., the water heater must be isolated from the gas supply piping system by closing its manual shut-off valve.

NOTE: Air may be present in the gas lines and could prevent the pilot from lighting on initial start-up. The gas lines should be purged of air by a qualified technician after installation of the gas piping system. While purging the gas piping system of air, insure that the fuel is not spilled in the area of the water heater installation, or any source of ignition. If the fuel is spilled while purging the piping system of air follow the "WHAT TO DO IF YOU SMELL GAS" instructions on the cover of this manual.

LP Gas Only

⚠ WARNING

Explosion Hazard

Have a qualified person make sure L.P. gas pressure does not exceed 13" water column.

Examples of a qualified person include: licensed plumbers, authorized gas company personnel, and authorized service personnel.

Failure to do so can result in death, explosion, or fire.

Liquefied petroleum gas is over 50% heavier than air and in the occurrence of a leak in the system, the gas will settle at floor level. Basements, crawl spaces, closets and areas below ground level will serve as pockets for the accumulation of gas. Before lighting an L.P. gas water heater, smell all around the appliance at floor level. If you smell gas, follow the instructions as given in the warning on the front page.

When your L.P. tank runs out of fuel, turn off the gas at all gas appliances including pilot lights. After the tank is refilled, all appliances must be re-lit according to their manufacturer's instructions.

Table 1
Natural Gas Pipe Capacity Table (Cu. Ft./Hr.)
Capacity of gas pipe of different diameters and lengths in cu. ft. per hr. with pressure drop of 0.3 in. and specific gravity of 0.60 (natural gas).

Nominal Iron Pipe Size, in.	Length of Pipe, Feet													
	10	20	30	40	50	60	70	80	90	100	125	150	175	200
1/2	132	92	73	63	56	50	46	43	40	38	34	31	28	26
3/4	278	190	152	130	115	105	96	90	84	79	72	64	59	55
1	520	350	285	245	215	195	180	170	160	150	130	120	110	100
1-1/4	1050	730	590	500	440	400	370	350	320	305	275	250	225	210
1-1/2	1600	1100	890	760	670	610	560	530	490	460	410	380	350	320

After the length of pipe has been determined, select the pipe size which will provide the minimum cubic feet per hour required for the gas input rating of the water heater. By formula:

$$\text{Cu. Ft. Per Hr. Required} = \frac{\text{Gas Input of Water Heater (BTU/HR)}}{\text{Heating Value of Gas (BTU/FT}^3\text{)}}$$

The gas input of the water heater is marked on the water heater data plate. The heating value of the gas (BTU/FT^3) may be determined by consulting the local natural gas utility.

Table 2
LP Gas Capacity Table
Maximum capacity of pipe in thousands of BTU per hour of undiluted liquefied petroleum gases (at 11 inches water column pressure). Based on a pressure drop of 0.5 inch water column.

Nominal Iron Pipe Size, in.	Length of Pipe, Feet											
	10	20	30	40	50	60	70	80	90	100	125	150
1/2	275	189	152	129	114	103	96	89	83	78	69	63
3/4	576	393	315	267	237	217	196	185	173	162	146	132
1	1071	732	590	504	448	409	378	346	322	307	275	252
1-1/4	2205	1496	1212	1039	913	834	771	724	677	630	567	511

Example: Input BTU requirement of the water heater 100,000 BTUH.
Total pipe length, 80 feet = 3/4" IPS required.

Additional tables are available in the latest edition of the "National Fuel Gas Code", ANSI Z223.1.

COMBUSTION AIR & VENTILATION

⚠ WARNING

Carbon Monoxide Warning

Water heater must be vented to outdoors.

Vent must be installed by a qualified technician using the installation instructions.

Examples of a qualified technican include: gas technicians, authorized gas company personel, and authorized service persons.

Failure to so do can result in death or carbon monoxide poisoning.

IMPORTANT: Air for combustion and ventilation must not come from a corrosive atmosphere. Any failure due to corrosive elements in the atmosphere is excluded from warranty coverage.

The following types of installation (not limited to the following) will require outdoor air for combustion due to chemical exposure and may reduce but not eliminate the presence of corrosive chemicals in the air:

- beauty shops
- photo processing labs
- buildings with indoor pools
- water heaters installed in laundry, hobby, or craft rooms
- water heaters installed near chemical storage areas

Combustion air must be free of acid-forming chemicals such as sulfur, fluorine, and chlorine. These elements are found in aerosol sprays, detergents, bleaches, cleaning solvents, air fresheners, paint, and varnish removers, refrigerants, and many other commercial and household products. When burned, vapors from these products form highly corrosive acid compounds. These products should not be stored or used near the water heater or air inlet.

Combustion and ventilation air requirements are determined by the location of the water heater. The water heater may be located in either an open (unconfined) area or in a confined area or small enclosure such as a closet or small room. Confined spaces are areas with less than 50 cubic feet for each 1,000 BTUH of the total input for all gas-using appliances.

Unconfined Space

A water heater in an unconfined space uses indoor air for combustion and requires at least 50 cubic feet for each 1,000 BTUH of the total input for all gas appliances. The table below shows a few examples of the minimum square footage (area) required for various BTUH inputs.

TABLE 3

BTUH Input	Minimum Square Feet with 8' Ceiling	Typical Room with 8' Ceiling
30,000	188	9 x 21
45,000	281	14 x 20
60,000	375	15 x 25
75,000	469	15 x 31
90,000	563	20 x 28
105,000	657	20 x 33
120,000	750	25 x 30
135,000	844	28 x 30

IMPORTANT:

- The area must be open and be able to provide the proper air requirements to the water heater. Areas that are being used for storage or contain large objects may not be suitable for water heater installation.
- Water heaters installed in open spaces in buildings with unusually tight construction may still require outdoor air to function properly. In this situation, outside air openings should be sized the same as for a confined space.
- Modern home construction usually requires supplying outside air into the water heater area.

Confined Space

For the correct and proper operation of this water heater, ample air must be supplied for the combustion, ventilation, and dilution of flue gases. Small enclosures and confined areas must have two permanent openings so that sufficient fresh air can be drawn from outside of the enclosure. One opening shall be within 12 inches of the top and one within 12 inches of the bottom of the enclosure as shown in Figure 6.

The size of each opening (free area) is determined by the total BTUH input of all gas utilization equipment (i.e., water heaters, furnaces, clothes dryers, etc.) and the method by which the air is provided. The BTUH input can be found on the water heater rating plate. Additional air can be provided by two methods:

1. All air from inside the building.
2. All air from outdoors.

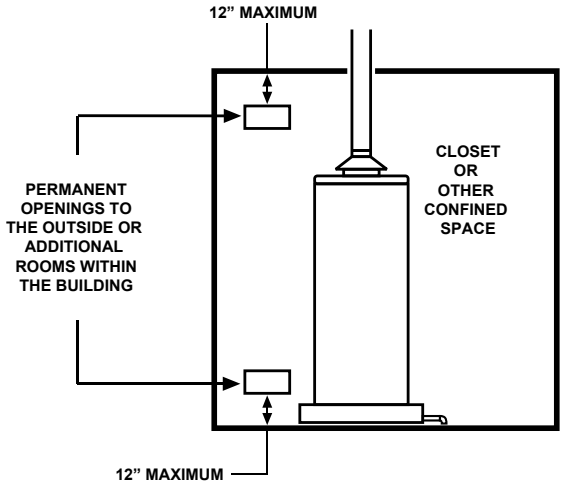

12" MAXIMUM
PERMANENT OPENINGS TO THE OUTSIDE OR ADDITIONAL ROOMS WITHIN THE BUILDING
CLOSET OR OTHER CONFINED SPACE
12" MAXIMUM

FIGURE 6.

All Air from Inside the Building

When additional air is to be provided to the confined area from additional room(s) within the building, the total volume of the room(s) must be of sufficient size to properly provide the necessary amount of fresh air to the water heater and other gas utilization equipment in the area. If you are unsure that the structure meets this requirement, contact your local gas utility company or other qualified agency for a safety inspection.

Each of the two openings shall have a minimum free area of 1 square inch per 1,000 BTUH of the total input rating of all gas utilization equipment in the confined area, but not less than 100 square inches (Figure 7).

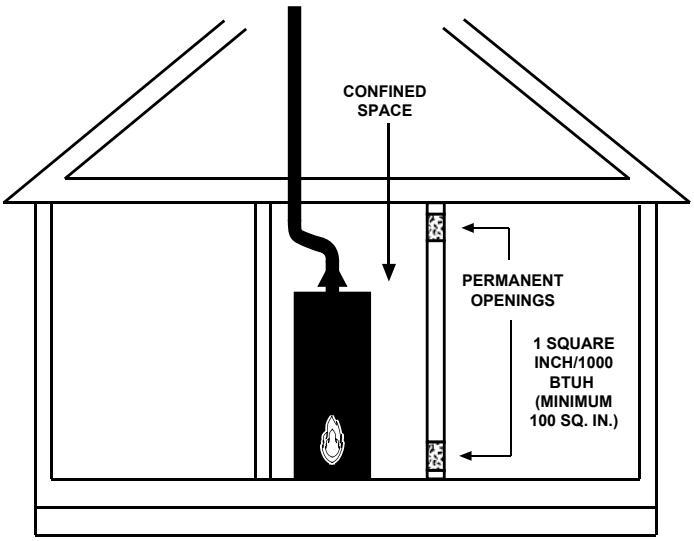


FIGURE 7.

All Air from Outdoors

Outdoor fresh air can be provided to a confined area either directly or by the use of vertical and horizontal ducts. The fresh air can be taken from the outdoors or from crawl or attic spaces that freely communicate with the outdoors. Attic or crawl spaces cannot be closed and must be properly ventilated to the outside.

Ductwork must be of the same cross-sectional area as the free area of the opening to which they connect. The minimum dimension of rectangular air ducts cannot be less than three inches.

The size of each of the two openings is determined by the method in which the air is to be provided. Refer to Table 4 to calculate the minimum free area for each opening. Figures 8, 9, 10 and 11 are typical examples of each method.

Louvers and Grilles

In calculating free area for ventilation and combustion air supply openings, consideration must be given to the blocking effect of protection louvers, grilles, and screens. These devices can reduce airflow, which in turn may require larger openings to achieve the required minimum free area. Screens must not be smaller than 1/4" mesh. If the free area through a particular design of louver or grille is known, it should be used in calculating the specified free area of the opening. If the design and free area are not known, it can be assumed that most wood louvers will allow 20 - 25% of free area while metal louvers and grilles will allow 60 - 75% of free area.

Louvers and grilles must be locked open or interconnected with the equipment so that they are opened automatically during equipment operation.

Keep louvers and grilles clean and free of debris or other obstructions.

TABLE 4

Minimum Free Area of Permanent Openings for Ventilation and Combustion Air Supply - All Air from Outdoors Only.

Based on total BTUH input rating for all utilizing equipment within the confined space.

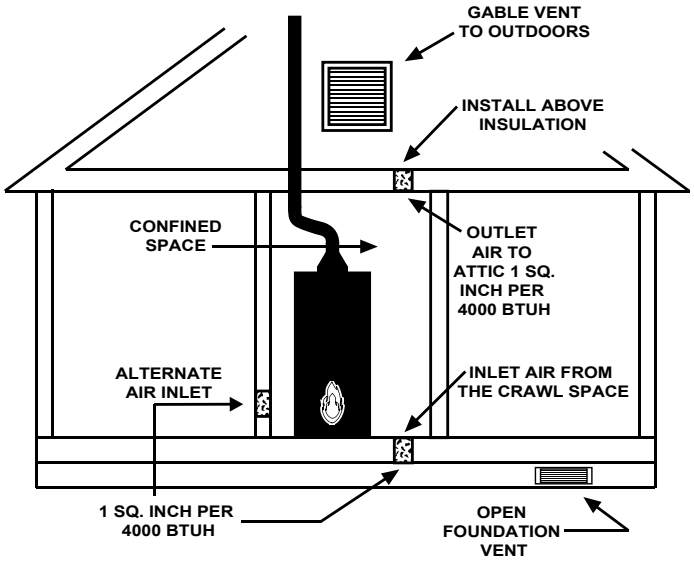
Opening Source	Minimum Free Area Per Opening (sq. in.)	Reference Drawing
*Direct to outdoors	1 sq. in, per 4000 BTUH	Figure 8
Vertical Ducts	1 sq. in, per 4000 BTUH	Figure 9
Horizontal Ducts	1 sq. in, per 2000 BTUH	Figure 10
Single Opening	1 sq. in, per 3000 BTUH	Figure 11

Example: A water heater with an input rating of 50,000 BTUH using horizontal ducts would require each opening to have a minimum free area of 25 square inches.

Minimum free area = 50,000 BTUH x 1 sq. in. / 2000 BTUH = 25 sq. in.

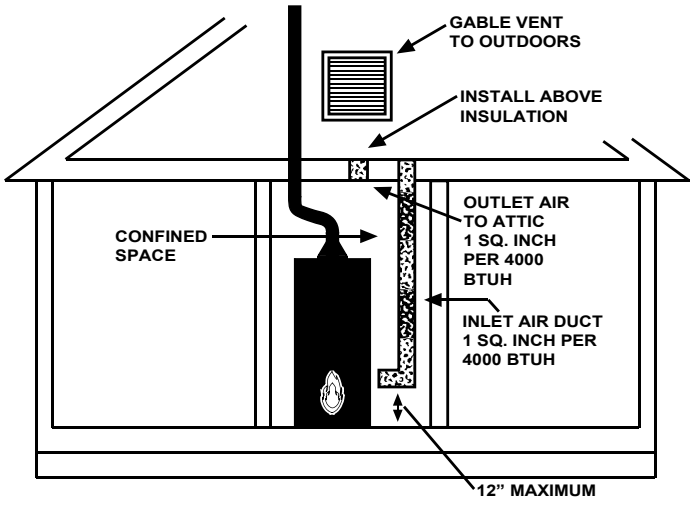
* These openings connect directly with the outdoors through a ventilated attic, a ventilated crawl space, or through an outside wall.

Consult the local codes of your area for specific ventilation and combustion air requirements.



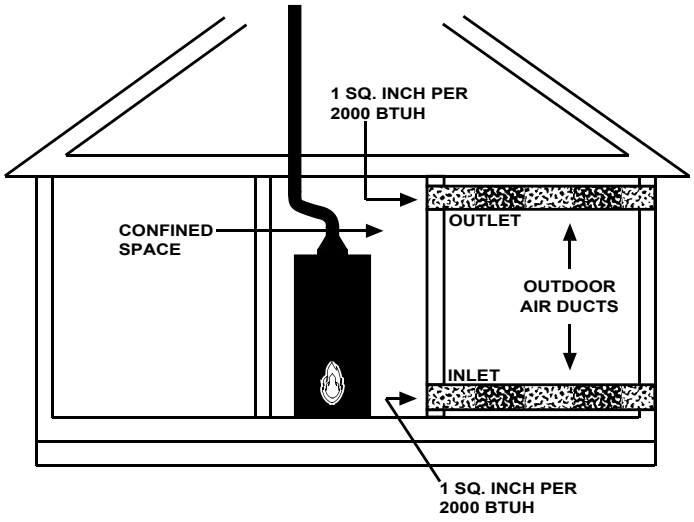
ALL AIR FROM OUTDOORS: INLET AIR FROM VENTILATED CRAWL SPACE/OUTLET AIR TO VENTILATED ATTIC

FIGURE 8.



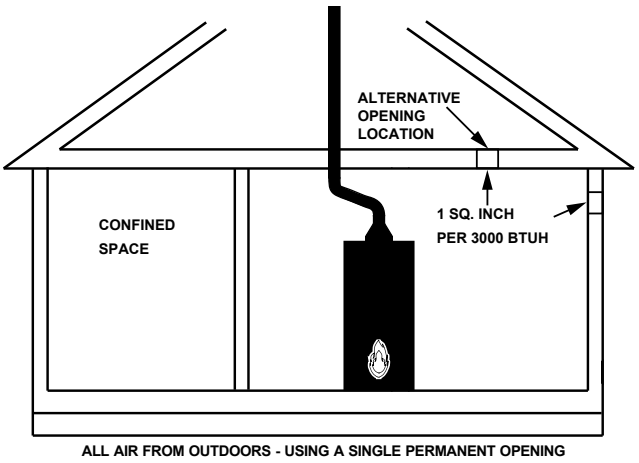
ALL AIR FROM OUTDOORS THROUGH VENTILATED ATTIC

FIGURE 9.



ALL AIR FROM OUTDOORS USING HORIZONTAL DUCTS

FIGURE 10.



ALL AIR FROM OUTDOORS - USING A SINGLE PERMANENT OPENING

FIGURE 11.

Vent Pipe System

This water heater uses a non-direct, single-pipe vent system to remove exhaust gases created by the burning of fossil fuels. Air for combustion is taken from the immediate water heater location or is ducted in from the outside (see "Combustion Air Supply and Ventilation" section).

This water heater must be properly vented for the removal of exhaust gases to the outside atmosphere. Correct installation of the vent pipe system is mandatory for the proper and efficient operation of this water heater and is an important factor in the life of the unit.

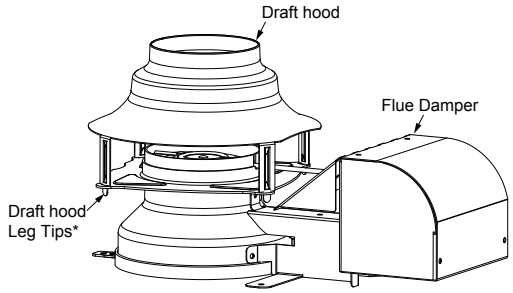
The vent pipe must be installed according to all local and state codes or, in the absence of local and state codes, the "National Fuel Gas Code", ANSI Z223.1(NFPA 54)-current edition. The vent pipe installation must not be obstructed so as to prevent the removal of exhaust gases to the outside atmosphere.

IMPORTANT: The use of vent dampers is not recommended by the manufacturer of this water heater. Although some vent dampers are certified by CSA International, this certification applies to the vent damper device only and does not mean they are certified for use on this water heater.

U.L. recognized fuel gas and carbon monoxide (CO) detectors are recommended in all applications and should be installed using the manufacturer's instructions and local codes, rules, or regulations.

IMPORTANT: If you lack the necessary skills required to properly install this venting system, you should not proceed, but get help from a qualified technician.

Draft Hood Installation



* Twist or bend the leg tips to secure the draft hood to the flue damper

FIGURE 12.

Align the legs of the draft hood with the slots provided. Insert the draft hood leg tips into slots on the flue damper's flange as shown in Figure 12. Secure the draft hood by twisting or bending the leg tips. See Figure 12. Do not alter the draft hood in any way. If you are replacing an existing water heater, be sure to use the new draft hood supplied with the water heater.

Vent Pipe Size

It is important that you follow the guidelines in these instructions for sizing a vent pipe system. If a transition to a larger vent size is required, the vent transition connection must be made at the draft hood outlet.

Vent Connectors

1. Type B, Double wall, U.L. Listed Vent Pipe.
2. Single wall Vent Pipe.

Maintain the manufacturer's specified minimum clearance from combustible materials when using type B double wall vent pipe.

Vent connectors made of type B, double wall vent pipe material may pass through walls or partitions constructed of combustible material if the minimum listed clearance is maintained.

Maintain a six inch minimum clearance from all combustible materials when using single wall vent pipe.

IMPORTANT: Single wall vent pipe cannot be used for water heaters located in attics and may not pass through attic spaces, crawl spaces or any confined or inaccessible location. A single wall metal vent connector cannot pass through any interior wall.

When installing a vent connector, please note the following (See Figures 13-15):

- Install the vent connector avoiding unnecessary bends, which create resistance to the flow of vent gases.
- Install without dips or sags with an upward slope of at least 1/4-inch per foot.
- Joints must be fastened by sheet metal screws or other approved means. It must be supported to maintain clearances and prevent separation of joints and damage.
- The length of the vent connector cannot exceed 75% of the vertical vent height.
- The vent connector must be accessible for cleaning, inspection, and replacement.
- Vent connectors cannot pass through any ceiling, floor, firewall, or fire partition.
- It is recommended (but not mandatory) that a minimum 12 inches of vertical vent pipe be installed on the draft hood prior to any elbow in the vent system.

IMPORTANT: Existing vent systems must be inspected for obstructions, corrosion, and proper installation.

Chimney Connection

IMPORTANT: Before connecting a vent to a chimney, make sure the chimney passageway is clear and free of obstructions. The chimney must be cleaned if previously used for venting solid fuel appliances or fireplaces. Also consult local and state codes for proper chimney sizing and application or, in the absence of local and state codes, the "National Fuel Gas Code", ANSI Z223.1(NFPA 54)-current edition.

- The connector must be installed above the extreme bottom of the chimney to prevent potentially blocking the flue gases.
- The connector must be firmly attached and sealed to prevent it from falling out.
- To aid in removing the connector, a thimble or slip joint may be used.
- The connector must not extend beyond the inner edge of the chimney as it may restrict the space between it and the opposite wall of the chimney (Figure 13).

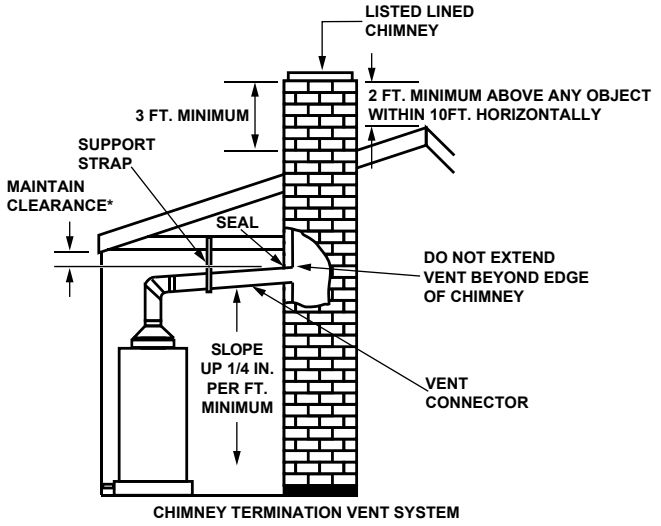

LISTED LINED CHIMNEY
2 FT. MINIMUM ABOVE ANY OBJECT WITHIN 10FT. HORIZONTALLY
3 FT. MINIMUM
SUPPORT STRAP
MAINTAIN CLEARANCE*
SEAL
DO NOT EXTEND VENT BEYOND EDGE OF CHIMNEY
SLOPE UP 1/4 IN. PER FT. MINIMUM
VENT CONNECTOR
CHIMNEY TERMINATION VENT SYSTEM

FIGURE 13.

Do not terminate the vent connector in a chimney that has not been certified for this purpose. Some local codes may prohibit the termination of vent connectors in a masonry chimney.

Vertical Exhaust Gas Vent

Vertical exhaust gas vents must be installed with U.L. listed type B vent pipe according to the vent manufacturer's instructions and the terms of its listing.

It must be connected to the water heater's draft hood by a listed vent connector or by directly originating at the draft hood opening.

Vertical gas vents must terminate with a listed cap or other roof assembly and be installed according to their manufacturer's instructions.

Gas vents must be supported to prevent damage, joint separation, and maintain clearances to combustible materials (Figures 14 and 15).

IMPORTANT: This gas vent must be terminated in a vertical position to facilitate the removal of the burnt gases.

An unused chimney flue or masonry enclosure may be used as a passageway for the installation of a gas vent (Figure 13).

Common (combined) venting is allowable with vertical type B vent systems and lined masonry chimneys as long as proper draft for the water heater is established under all conditions of operation. CAUTION: DO NOT common vent this water heater with any power vented appliance.

Figures 13-15 are examples of vent pipe system installations and may or may not be typical for your specific application. Consult the "National Fuel Gas Code",

NFPA 54, ANSI Z223.1-current edition and the guidelines set forth by prevailing local codes.

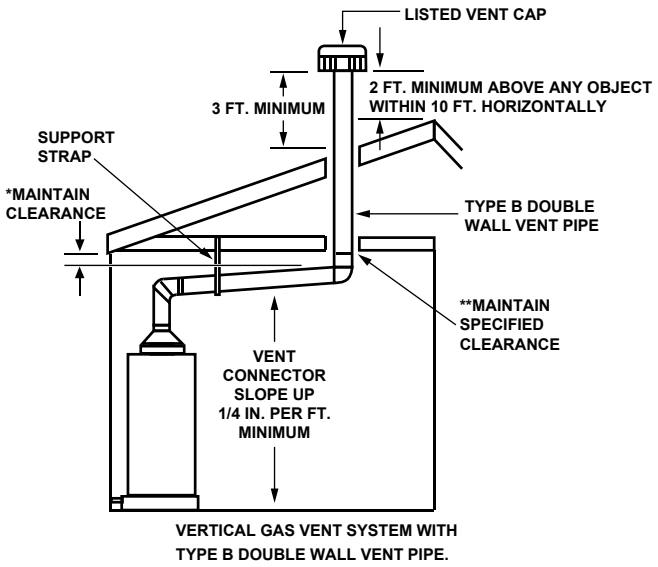

LISTED VENT CAP
3 FT. MINIMUM
2 FT. MINIMUM ABOVE ANY OBJECT WITHIN 10 FT. HORIZONTALLY
SUPPORT STRAP
*MAINTAIN CLEARANCE
TYPE B DOUBLE WALL VENT PIPE
**MAINTAIN SPECIFIED CLEARANCE
VENT CONNECTOR SLOPE UP 1/4 IN. PER FT. MINIMUM
VERTICAL GAS VENT SYSTEM WITH TYPE B DOUBLE WALL VENT PIPE.

FIGURE 14.

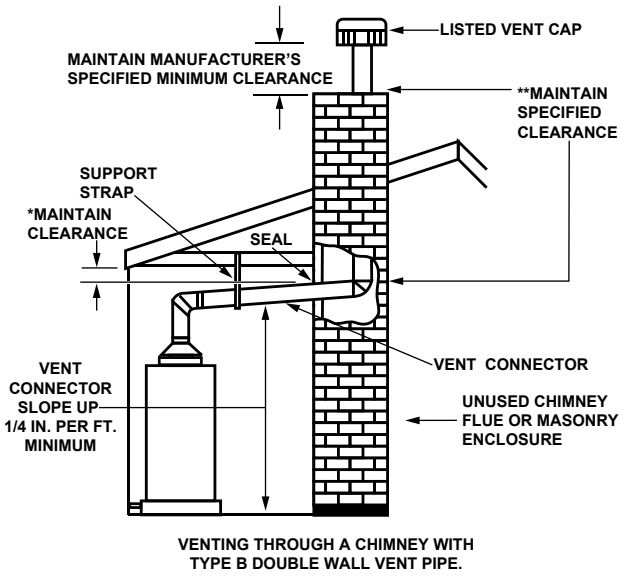

LISTED VENT CAP
MAINTAIN MANUFACTURER'S SPECIFIED MINIMUM CLEARANCE
**MAINTAIN SPECIFIED CLEARANCE
SUPPORT STRAP
*MAINTAIN CLEARANCE
SEAL
VENT CONNECTOR
VENT CONNECTOR SLOPE UP 1/4 IN. PER FT. MINIMUM
UNUSED CHIMNEY FLUE OR MASONRY ENCLOSURE
VENTING THROUGH A CHIMNEY WITH TYPE B DOUBLE WALL VENT PIPE.

FIGURE 15.

* Maintain vent pipe clearance requirements to local, state and/or the "National Fuel Gas Code", ANSI Z223.1(NFPA 54)-current edition.

** NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances states that these chimneys are intended to be installed in accordance with the installation instructions provided with each chimney support assembly. Minimum air space clearance to combustible materials should be maintained as marked on the chimney sections.

WATER SYSTEM PIPING

Piping Installation

Piping, fittings, and valves should be installed according to the installation drawing (Figure 16). If the indoor installation area is subject to freezing temperatures, the water piping must be protected by insulation.

The water supply pressure should not exceed 80 psi. If this occurs, a pressure reducing valve with a bypass should be installed in the cold water inlet line. This should be placed on the supply to the entire house in order to maintain equal hot and cold water pressures.

IMPORTANT: Heat cannot be applied to the water fittings on the heater as they may contain nonmetallic parts. If solder connections are used, solder the pipe to the adapter before attaching the adapter to the hot and cold water fittings.

IMPORTANT: Always use a good grade of joint compound and be certain that all fittings are drawn up tight.

1. Install the water piping and fittings as shown in Figure 13. Connect the cold water supply (3/4" NPT) to the cold water inlet fitting. Connect the hot water supply (3/4" NPT) to the hot water outlet fitting.

IMPORTANT: Some models may contain energy saving heat traps to prevent the circulation of hot water within the pipes. Do not remove the inserts within the heat traps.

2. The installation of unions in both the hot and cold water supply lines is recommended for ease of removing the water heater for service or replacement.
3. The manufacturer of this water heater recommends installing a mixing valve or an anti-scald device in the domestic hot water line as shown in Figure 17. These valves reduce the point-of-use temperature of the water by mixing cold and hot water and are readily available for use.
4. If installing the water heater in a closed water system, install an expansion tank in the cold water line as specified under Closed System/Thermal Expansion.
5. Install a shut-off valve in the cold water inlet line. It should be located close to the water heater and be easily accessible. Know the location of this valve and how to shut off the water to the heater.
6. A temperature and pressure relief valve must be installed in the opening marked "Temperature and Pressure (T & P) Relief Valve" on the water heater. A discharge line must be added to the opening of the T&P Relief Valve. Follow the instructions under Temperature and Pressure Relief Valve.
7. After piping has been properly connected to the water heater, remove the aerator at the nearest hot water faucet. Open the hot water faucet and allow the tank to completely fill with water. To purge the lines of any excess air, keep the hot water faucet open for 3 minutes after a constant flow of water is obtained. Close the faucet and check all connections for leaks.

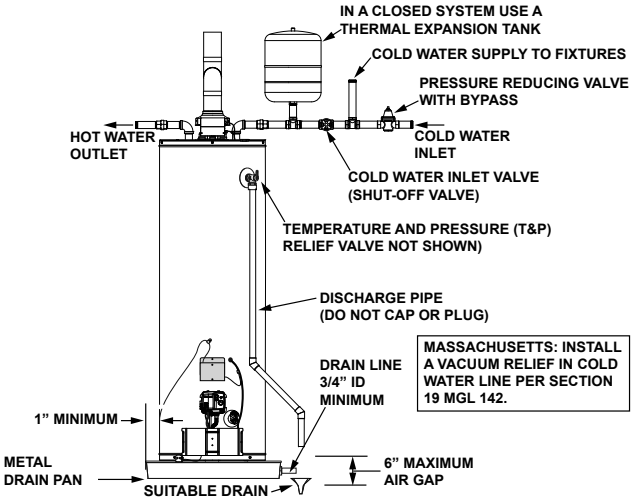

IN A CLOSED SYSTEM USE A THERMAL EXPANSION TANK
COLD WATER SUPPLY TO FIXTURES
PRESSURE REDUCING VALVE WITH BYPASS
HOT WATER OUTLET
COLD WATER INLET
COLD WATER INLET VALVE (SHUT-OFF VALVE)
TEMPERATURE AND PRESSURE (T&P) RELIEF VALVE NOT SHOWN)
DISCHARGE PIPE (DO NOT CAP OR PLUG)
DRAIN LINE 3/4" ID MINIMUM
MASSACHUSETTS: INSTALL A VACUUM RELIEF IN COLD WATER LINE PER SECTION 19 MGL 142.
1" MINIMUM
METAL DRAIN PAN
SUITABLE DRAIN
6" MAXIMUM AIR GAP

FIGURE 16.

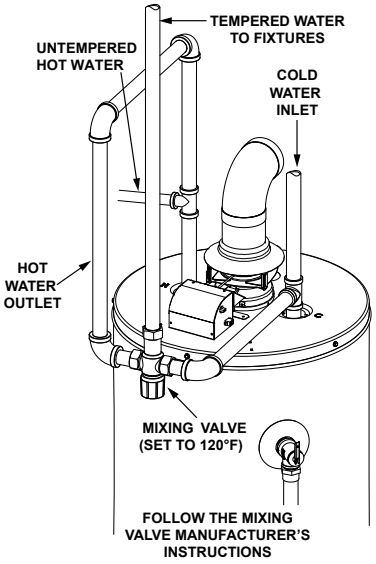

TEMPERED WATER TO FIXTURES
UNTEMPERED HOT WATER
COLD WATER INLET
HOT WATER OUTLET
MIXING VALVE (SET TO 120°F)
FOLLOW THE MIXING VALVE MANUFACTURER'S INSTRUCTIONS

FIGURE 17.

Please note the following:

- The system should be installed only with piping that is suitable for potable (drinkable) water such as copper, CPVC, or polybutylene. This water heater must not be installed using iron piping or PVC water piping.
- Use only pumps, valves, or fittings that are compatible with potable water.
- It is recommend that only full flow ball or gate valves are used in water piping installations. The use of valves that may cause excessive restriction to water flow is not recommended.
- Use only 95/5 tin-antimony or other equivalent solder. Any lead based solder must not be used.
- Piping that has been treated with chromates, boiler seal, or other chemicals must not be used.
- Chemicals that may contaminate the potable water supply must not be added to the piping system.

Closed System/Thermal Expansion

CAUTION

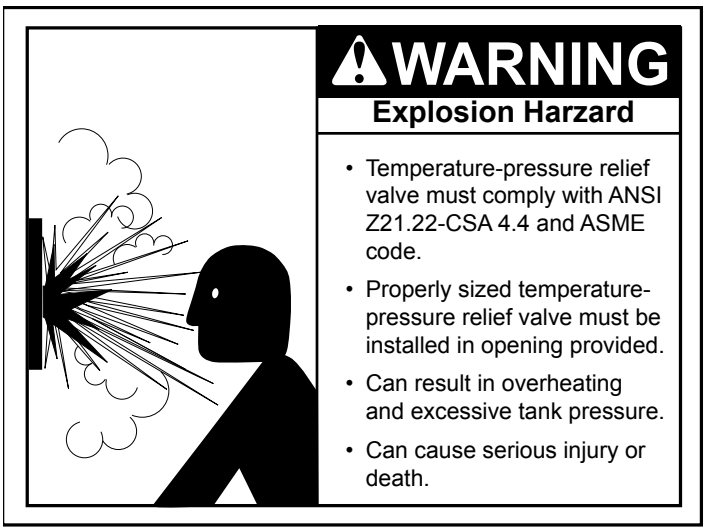
Property Damage Hazard

- All water heaters eventually leak
- Do not install without adequate drainage.

As water is heated, it expands (thermal expansion). In a closed system, the volume of water will grow. As the volume of water grows, there will be a corresponding increase in water pressure due to thermal expansion. Thermal expansion can cause premature tank failure (leakage). This type of failure is not covered under the limited warranty. Thermal expansion can also cause intermittent temperature-pressure relief valve operation: water discharged from the valve due to excessive pressure build up. The temperature-pressure relief valve is not intended for the constant relief of thermal expansion. This condition is not covered under the limited warranty.

A properly-sized thermal expansion tank should be installed on all closed systems to control the effects of thermal expansion. Contact a plumbing service agency or your retail supplier regarding the installation of a thermal expansion tank.

Temperature and Pressure Relief Valve


WARNING
Explosion Harzard
• Temperature-pressure relief valve must comply with ANSI Z21.22-CSA 4.4 and ASME code.
• Properly sized temperature-pressure relief valve must be installed in opening provided.
• Can result in overheating and excessive tank pressure.
• Can cause serious injury or death.

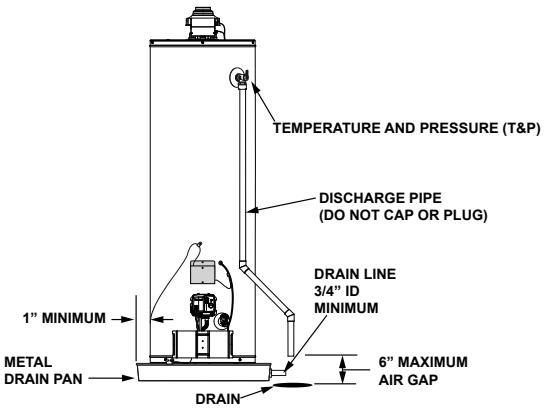


FIGURE 18.

For protection against excessive pressures and temperatures, a temperature and pressure relief valve must be installed in the opening marked "T & P RELIEF VALVE" (see Figure 17). This valve must be design certified by a nationally recognized testing laboratory that maintains periodic inspection of the production of listed equipment or materials as meeting the requirements for Relief Valves for Hot Water Supply Systems, ANSI Z21.22. The function of the temperature and pressure relief valve is to discharge water in large quantities in the event of excessive temperature or pressure developing in the water heater. The valve's relief pressure must not exceed the working pressure of the water heater as stated on the rating plate.

IMPORTANT: Only a new temperature and pressure relief valve should be used with your water heater. Do not use an old or existing valve as it may be damaged or not adequate for the working pressure of the new water heater. Do not place any valve between the relief valve and the tank.

The Temperature & Pressure Relief Valve:

- Must not be in contact with any electrical part.
- Must be connected to an adequate discharge line.
- Must not be rated higher than the working pressure shown on the rating plate of the water heater.

The Discharge Line:

- Must not be smaller than the pipe size of the relief valve or have any reducing coupling installed in the discharge line.
- Must not be capped, blocked, plugged or contain any valve between the relief valve and the end of the discharge line.
- Must terminate a maximum of six inches above a floor drain or external to the building. In cold climates, it is recommended that the discharge pipe be terminated at an adequate drain inside the building.
- Must be capable of withstanding 250°F (121°C) without distortion.
- Must be installed to allow complete drainage of both the valve and discharge line.

T&P Relief Valve and Pipe Insulation (Some Models)

1. Locate the temperature and pressure relief valve on the water heater (also known as a T&P relief valve). See Figure 18.
2. Locate the slit running the length of the T&P relief valve insulation.
3. Spread the slit open and fit the insulation over the T&P relief valve. See Figure 19. Apply gentle pressure to the insulation to ensure that it is fully seated on the T&P Relief Valve. Once seated, secure the insulation with duct tape.
   IMPORTANT: The insulation or tape should not block or cover the T&P relief valve drain opening. Also, the insulation or tape should not block or hinder access to the manual relief lever (Figure 19).
4. Locate the hot water (outlet) & cold water (inlet) pipes to the water heater.
5. Locate the slit running the length of a section of pipe insulation.
6. Spread the slit open and slip the insulation over the cold water (inlet) pipe. Apply gentle pressure along the length of the insulation to ensure that it is fully seated around the pipe. Also, ensure that the base of the insulation is flush with the water heater. Once seated, secure the insulation with duct tape.
7. Repeat steps 5 and 6 for the hot water (outlet) pipe.
8. Add additional sections of pipe insulation as needed.

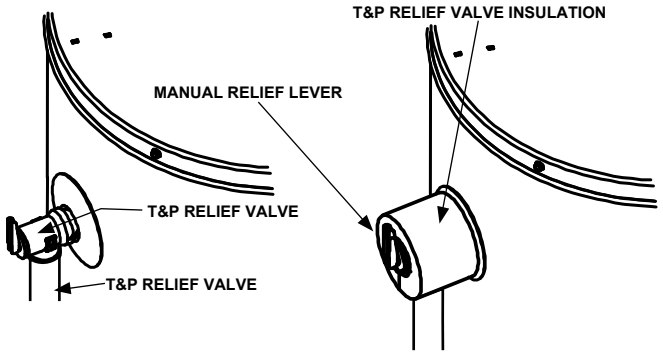


FIGURE 19.

IMPORTANT INFORMATION ABOUT THIS WATER HEATER

This gas water heater was manufactured to voluntary safety standards to reduce the likelihood of a flammable vapor ignition incident. The new technology used in meeting these standards makes this product more sensitive to installation errors. Please review the following checklist and make any required installation upgrades or changes.

Questions? Contact Residential Technical Assistance by referencing the phone number on the front of the Installation Instructions and Use & Care Guide.

Installation Checklist

Water Heater Location

Water heater location is important and can affect system performance. Please check the following:

- ☐ Installation area free of corrosive elements and flammable materials.
- ☐ Centrally located with the water piping system (For new installations). Located as close to the gas piping and vent pipe system as possible.
- ☐ Located indoors and in a vertical position. Protected from freezing temperatures.
- ☐ Proper clearances from combustible surfaces maintained and not installed directly on a carpeted floor.
- ☐ Provisions made to protect the area from water damage. Metal drain pan installed and piped to an adequate drain.
- ☐ Sufficient room to service the water heater. See Clearances and Accessibility section of this manual.
- ☐ Water heater not located near an air moving device.
- ☐ Is the installed environment dirty (excessive amounts of lint, dirt, dust, etc.)? If so, the base-ring filter located on the bottom of the water heater will need to be cleaned periodically. Refer to the Maintenance of your Water Heater section of this manual for information on cleaning the base-ring filter.

Combustion Air Supply and Ventilation

Check for sufficient combustion air supply. Insufficient air for the combustion of gas will result in the flame becoming “lazy”, thereby allowing heat to build up in the combustion chamber. This excessive heat will cause a thermal switch on the door assembly to trip. Is the water heater installed in a closet or other small, enclosed space? If so:

- ☐ Are there openings for make-up air to enter and exit the room/area?
- ☐ Are the openings of sufficient size? Remember, if there are other gas-fired or air-consuming appliances in the same room, you need more make-up air. Refer to the Location Requirements section of this water heater manual for specific requirements.

Fresh air not taken from areas that contain negative pressure producing devices such as exhaust fans, dryers, fireplaces, etc.

- ☐ Is there a furnace/air handler in the same room space as the water heater? If so, has a return air duct system been attached that exits the room? If so, check for leaks on the air duct system. If no air duct system is present, correct immediately by contacting a local Heating, Ventilation, Air-Conditioning & Refrigeration (HVAC-R) authorized service provider.
- ☐ Fresh air supply free of corrosive elements and flammable vapors.
- ☐ Fresh air openings sized correctly with consideration given to the blocking effect of louvers and grilles.
- ☐ Ductwork is the same cross-sectional area as the openings.

Vent Pipe System

Check for proper drafting at the water heater draft hood. Refer to the “Checking the Draft” section of this manual for the test procedure. If the procedure shows insufficient draft is present, please check the following.

- ☐ Draft hood properly installed.
- ☐ Vent connectors securely fastened with screws and supported properly to maintain six inch clearance.
- ☐ Vent connector made of approved material and sized correctly.
- ☐ Vent pipe system installed according to all local and state codes or, in the absence of local and state codes, the “National Fuel Gas Code”, ANSI Z223.1(NFPA 54)-current edition.
- ☐ Flue baffle properly positioned in the flue tube.
- ☐ Check the vent system for restrictions/obstructions and check the vent termination height. Refer to the Combustion Air and Ventilation section of this water heater manual for specific requirements.
- ☐ Recheck for sufficient combustion air supply.

Water System Piping

- ☐ Temperature and pressure relief valve properly installed with a discharge line run to an open drain and protected from freezing.
- ☐ All piping properly installed and free of leaks.
- ☐ Heater completely filled with water.
- ☐ Closed system pressure build-up devices installed.
- ☐ Mixing valve (when applicable) installed per manufacturer’s instructions (See Water Temperature Regulation section).

Gas Supply and Piping

- ☐ Gas type is the same as that listed on the water heater rating plate.
- ☐ Gas line equipped with shut-off valve, union, and drip leg.
- ☐ Use pipe joint compound or teflon tape marked as being resistant to the action of petroleum [Propane (L.P.)] gases.
- ☐ Adequate pipe size and approved pipe material.
- ☐ An approved noncorrosive leak detection solution used to check all connections and fittings for possible gas leaks. Correct any leak found.

OPERATING YOUR WATER HEATER

Lighting Instructions

Read and understand these directions thoroughly before attempting to start or re-start the water heater. Make sure the viewport is not missing or damaged. (See Figure 27) Make sure the tank is completely filled with water before turning the power switch on. Check the data plate near the gas control valve/thermostat for the correct gas. Do not use this water heater with any gas other than the one listed on the data plate. If you have any questions or doubts, consult your gas supplier or gas utility company.

⚠ WARNING

Explosion Hazard

Replace view port if glass is missing or damaged.

Failure to do so can result in death, explosion or fire.

FOR YOUR SAFETY READ BEFORE LIGHTING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

FLAMMABLE

BEFORE LIGHTING: ENTIRE SYSTEM MUST BE FILLED WITH WATER AND AIR PURGED FROM ALL LINES

A. This appliance is equipped with an ingnition device which automatically lights the pilot. Do **not** open the inner door of the appliance and try to light the pilot by hand.

B. BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

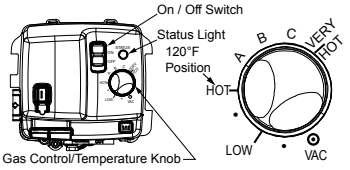
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

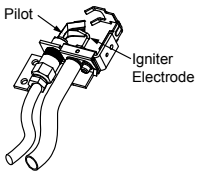
C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not move by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately contact a qualified installer or service agency to replace a flooded water heater. Do not attempt to repair the unit! It must be replaced!

E. DO NOT USE THIS APPLIANCE IF THERE HAS BEEN AN IGNITION OF VAPORS. Immediately call a qualified service technician to inspect the appliance. Water heaters subjected to a flammable vapors ignition will show a discoloration on the air intake grid and require replacement of the entire water heater.

LIGHTING INSTRUCTIONS





1. STOP! It is imperative that you read the safety warnings above on this label.
2. Remove the outer door.
3. Move the ON / OFF switch on the Gas Control Valve/Thermostat to the OFF position.
4. To clear any gas that may have accumulated, wait ten (10) minutes. If you then smell gas, STOP! Follow "B" in the safety warning above. If you do not smell gas go to the next step.
5. Turn on all electric power to the appliance. (Connect to a grounded 110/120 volt power outlet.)
6. Move the ON / OFF switch on the Gas Control Valve/ Thermostat to the ON position.
7. Turn the gas control/temperature knob to the "LOW" temperature setting. As shown above.
8. This appliance is equipped with a device that automatically lights the pilot. DO NOT TRY TO LIGHT THE PILOT BY HAND.
9. When the pilot is lit, the status light should blink a heartbeat (bright, dim, bright, dim, etc). If the status light does not start blinking, repeat steps 3 - 7.

   The pilot can be located by looking through the glass view port. If the pilot is lit, you will see the pilot flame through the glass view port.

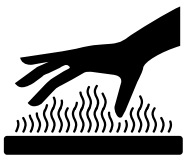
   IMPORTANT:If the appliance (pilot) fails to light after several tries, follow the instructions "To Turn Off Gas to Appliance" and call a qualified service technician or gas supplier. Record any status light flash codes.
10. Set the gas control/temperature knob to the desired setting.
11. Replace the outer door.
12. Set thermostat to desired setting.

⚠ DANGER: Hotter water increases the risk of scald injury. consult the instruction manual before changing temperature.

TO TURN OFF GAS TO APPLIANCE

1. Turn off the gas to the water heater at the manual shut-off valve.
2. Move the ON / OFF switch on the Gas Control Valve/Thermostat to the OFF position.
3. Turn off all electric power to the appliance. (Disconnect from grounded 110/120 volt power outlet.)

Checking the Draft



⚠WARNING

Burn Hazard

Do not touch vent.

Doing so can result in burns.

After successfully lighting the water heater, allow the unit to operate for 15 minutes and check the draft hood relief opening for proper draft (Figure 20). Make sure all other appliances in the area are operating and all doors are closed when performing the draft test. Pass a match flame around the relief opening of the draft hood. A steady flame drawn into the opening indicates proper draft.

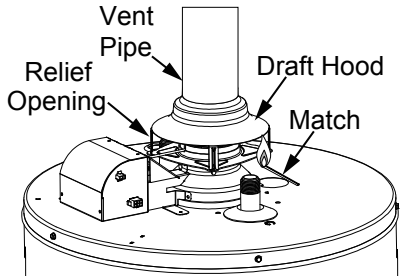


FIGURE 20.

If the flame flutters or is blown out, combustion products are escaping from the relief opening. If this occurs, do not operate the water heater until proper adjustments or repairs are made to the vent pipe system and/or air supply requirements.

Burner Flames

Inspect the burner flames through the viewport and compare them to the drawings in Figure 21. A properly operating burner should produce a soft blue flame. Blue tips with yellow inner cones are satisfactory. The tips of the flame may have a slight yellow tint. The flame should not be all yellow or have a sharp blue-orange color. Contaminated air may cause an orange colored flame. Contact a qualified technician if the flame is not satisfactory.

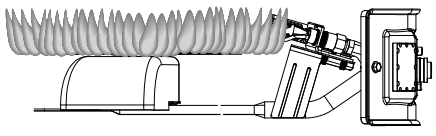


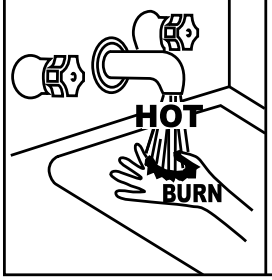
FIGURE 21.

Emergency Shut Down

IMPORTANT: Should overheating occur or the gas supply fails to shut off, turn off the water heater's manual gas control valve and call a qualified technician.

Water Temperature Regulation

⚠DANGER



Water temperature over 125°F (52°C) can cause servere burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

Due to the nature of the typical gas water heater, the water temperature in certain situations may vary up to 30°F (16.7 °C) higher or lower at the point of use such as, bathtubs, showers, sink, etc.

HOTTER WATER CAN SCALD: Water heaters are intended to produce hot water. Water heated to a temperature which will satisfy space heating, clothes washing, dish washing, and other sanitizing needs can scald and permanently injure you upon contact. Some people are more likely to be permanently injured by hot water than others. These include the elderly, children, the infirm, or physically/mentally handicapped. If anyone using hot water in your home fits into one of these groups or if there is a local code or state law requiring a certain temperature water at the hot water tap, then you must take special precautions. In addition to using the lowest possible temperature setting that satisfies your hot water needs, a means such as a mixing valve should be used at the hot water taps used by these people or at the water heater. Mixing valves are available at plumbing supply or hardware stores. See Figure 17. Follow manufacturer's instructions for installation of the valves. Before changing the factory setting on the thermostat, see Figure 29. Using the lowest hot water temperature that meets your needs will also provide the most energy efficient operation of the water heater.

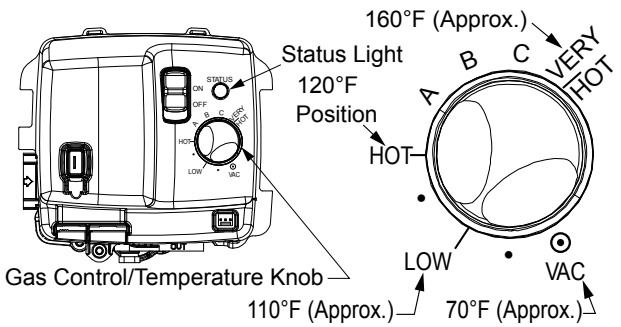
Never allow small children to use a hot water tap, or to draw their own bath water. Never leave a child or handicapped person unattended in a bathtub or shower.

NOTE: A water temperature range of 120°F-140°F (49°C-60°C) is recommended by most dishwasher manufacturers.

The thermostat of this water heater has been factory set at the VAC (Vacation) position. It is adjustable and must be reset to the desired temperature setting to reduce the risk of scald injury. The HOT mark is indicative of approximately 120°F (49°C) and is the preferred starting point. See Figure 22 on the next page. Some states have a requirement for a lower setting.

Turn the water temperature dial clockwise (↷) to increase the temperature, or counterclockwise (↶) to decrease the temperature.

Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.



Water Temperature °F	Time for 1st Degree Burn (Less Severe Burns)	Time for Permanent Burns 2nd & 3rd Degree (Most Severe Burns)
110	(normal shower temp.)	
116	(pain threshold)	
116	35 minutes	45 minutes
122	1 minute	5 minutes
131	5 seconds	25 seconds
140	2 seconds	5 seconds
149	1 second	2 seconds
154	instantaneous	1 second
(U.S. Government Memorandum, C.P.S.C., Peter L. Armstrong, Sept. 15,1978)		

FIGURE 22.

NOTE: During low demand periods when hot water is not being used, a lower thermostat setting will reduce energy losses and may satisfy your normal hot water needs. If hot water use is expected to be more than normal, a higher thermostat setting may be required to meet the increased demand. When leaving your home for extended periods (vacations, etc.) turn the temperature dial to its lowest setting. This will maintain the water at low temperatures with minimum energy losses and prevent the tank from freezing during cold weather.

Water Temperature Adjustment

The water temperature setting can be adjusted from 70°F to 160°F. Turn the Gas Control/Temperature Knob to the desired setting/temperature.

NOTE: The temperatures indicated are approximates. The actual temperature of the heated water may vary.

Operating Modes and Settings

- **Standard Mode** - The controller adjusts the water heater to maintain the temperature set by the user.
- **Vacation Setting** - The Vacation Setting (VAC) sets the controller at approximately 70°F. This setting is recommended when the water heater is not in use for a long period of time. This effectively turns the controller temperature setting down to a temperature that prevents the water in the water heater from freezing while still conserving energy.

Status Light Code

Table 5

LED FLASH SEQUENCE	CONTROL STATUS
Short flash once every four second	IDLE (No call for heat, no fault conditions)
“Heartbeat”, alternates bright/dim	Call for Heat (No fault conditions)
One Flash, three second pause	Low Flame Signal (control continues to operate)
Two Flash, three second pause	End Switch Failed Closed
Three Flash, three second pause	End Switch Failed Open or TCO Limit Lockout
Four Flash, three second pause	ECO Limit Lockout (Overheat Failure)
Five Flash, three second pause	Flame Out of Sequence
Six-One Flash, three second pause	Soft Lockout* - Retry Limit - Failed TFI (Trial for Ignition)
Six-Two Flash, three second pause	Soft Lockout* - Recycle Limit - Flame Lost - END Switch Fails
Six-Three Flash, three second pause	Soft Lockout* - Recycle Limit - Flame Lost
Six-Four Flash, three second pause	Soft Lockout* - Flame out of Sequence Sensed
Seven Flash, three second pause	Flammable Vapor Sensor (FVS) Lockout
Eight-One Flash, three second pause	Flammable Vapor Sensor (FVS) Fault Detected
Eight-Two Flash, three second pause	Temperature Sensor Fault Detected
Eight-Three Flash, three second pause	Electronic Fault Detected
Eight-Four Flash, three second pause	Gas Control Valve/Thermostat Fault Detected

* Soft Lockout - 20 minute wait before returning to normal mode.

ELECTRICAL CONNECTIONS/WIRING DIAGRAM

Electrical Connections

Before plugging in the water heater, always make sure:

- The Voltage and frequency correspond to that specified on the water heater.
- The electrical outlet has the proper overload fuse or breaker protection.
- Water heater to be located within 6 feet of 120VAC outlet.
- Unit is to connect to a 120VAC electrical supply outlet (extension cord is not allowed).
- The water heater and the outlet are properly grounded.
- Installed in accordance with prevailing provisions of local codes, or in the absence of such, National Electric Code, ANSI/NFPS 70 current edition.

Completely fill the tank with water and check all connections for leaks. Open the nearest hot water faucet and let it run for three (3) minutes to purge the water lines of air and sediment and to ensure complete filling of the tank. The Electrical power may then be turned on. Verify proper operation after servicing.

⚠WARNING

Electric Shock Hazard

Plug into a 3 prong outlet.

Do not remove ground prong.

Do not use an adapter.

Do not use an extension cord.

Failure to follow these instructions can result in death, fire, or electrical shock.

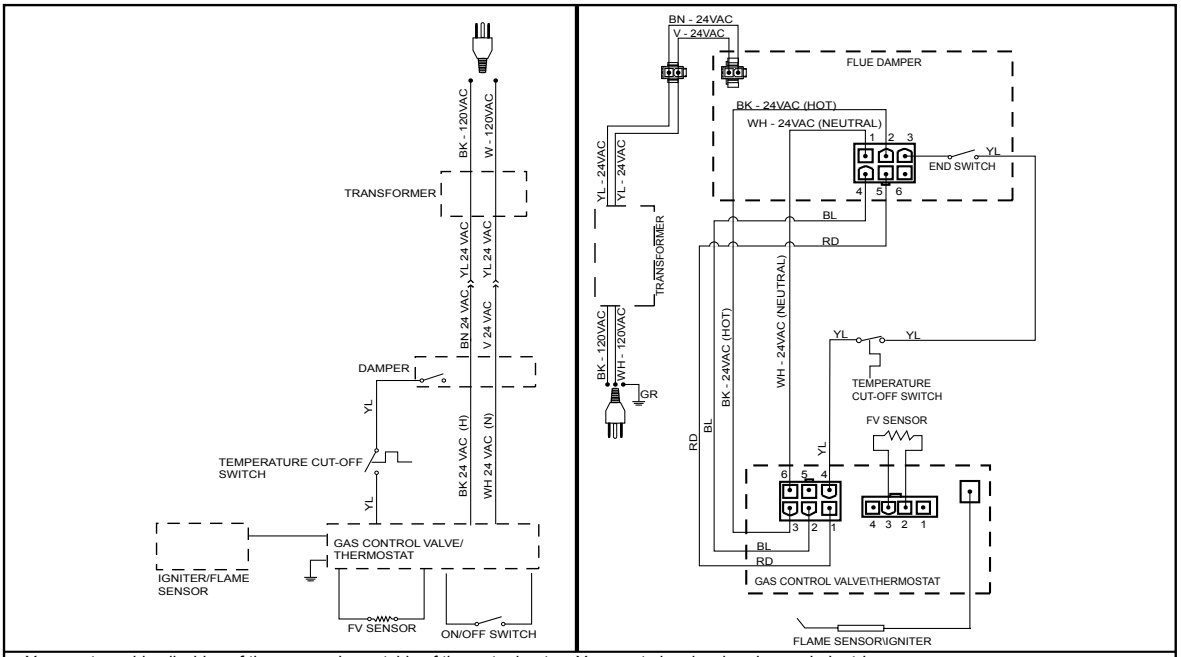
⚠WARNING

Electric Shock Hazard

Disconnect power before servicing.

Replacing all parts and panels before operating.

Failure to do socan result in death or electrical shock



You must provide all wiring of the proper size outside of the water heater. You must obey local codes and electric utility requirements when you install this wiring. This appliance must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code ANSI/NFPA No 70 (current edition) and/or THE CSA C22.1 ELECTRICAL CODE.(LATEST EDITION)

Note: If any of the original wire as supplied with the appliance must be replaced, it must be replaced with 105°C wire or its equivalent.

FIGURE 23.

Operational Conditions

Condensation

Whenever the water heater is filled with cold water, some condensate will form while the burner is on. A water heater may appear to be leaking when in fact the water is condensation. This usually happens when:

a. A new water heater is filled with cold water for the first time.

b. Burning gas produces water vapor in water heaters, particularly high efficiency models where flue temperatures are lower.

c. Large amounts of hot water are used in a short time and the refill water in the tank is very cold.

Moisture from the products of combustion condense on the cooler tank surfaces and form drops of water which may fall onto the burner or other hot surfaces to produce a “sizzling” or “frying” noise.

Excessive condensation can cause pilot outage due to water running down the flue tube onto the main burner and putting out the pilot.

Because of the suddenness and amount of water, condensation water may be diagnosed as a “tank leak”. After the water in the tank warms up (about 1-2 hours), the condition should disappear.

Do not assume the water heater is leaking until there has been enough time for the water in the tank to warm up.

An undersized water heater will cause more condensation. The water heater must be sized properly to meet the family’s demands for hot water including dishwashers, washing machines and shower heads.

Excessive condensation may be noticed during the winter and early spring months when incoming water temperatures are at their lowest.

Good venting is essential for a gas fired water heater to operate properly as well as to carry away products of combustion and water vapor.

CAUTION

Property Damage Hazard

- All water heaters eventually leak
- Do not install without adequate drainage.

It is always recommended that a suitable metal drain pan be installed under the water heater to protect the area from water damage resulting from normal condensation production, a leaking tank or piping connections. Refer to the “Location Requirements” section.

Water Heater Sounds

During the normal operation of the water heater, sounds or noises may be heard. These noises are common and may result from the following:

1. Normal expansion and contraction of metal parts during periods of heat-up and cool-down.
2. Condensation causes sizzling and popping within the burner area and should be considered normal.
3. Sediment buildup in the tank bottom will create varying amounts of noise and may cause premature tank failure. Drain and flush the tank as directed under the “Draining and Flushing” section.

Smoke/Odor

The water heater may give off a small amount of smoke and odor during the initial start-up of the unit. This is due to the burning off of oil from metal parts of a new unit and will disappear after a brief period of operation.

“AIR” In Hot Water Faucets

Hydrogen gas can be produced in a hot water system that has not been used for a long period of time (generally two weeks or more). Hydrogen gas is extremely flammable and can ignite when exposed to a spark or flame. To prevent the possibility of injury under these conditions, we recommend the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance which is connected to the hot water system. If hydrogen is present, there will probably be an unusual sound such as air escaping through the faucet as water begins to flow. Do not smoke or have any open flame near the faucet at the time it is open.

Safety Shut-off

This water heater is designed to automatically shut-off in the event of the following:

1. The water temperature exceeds 189°F (87°C) for 160°F models.
3. Excessive combustion chamber temperatures.
4. The presence of flammable vapors.

This unit is equipped with a flammable vapor sensor, designed to shut off the gas supply in the event the heater has been exposed to flammable vapors (spilled gasoline or paint fumes for example). **IMPORTANT:** If the flammable vapor sensor activates a qualified service person must be contacted to reset the water heater. This unit is also equipped with a thermal switch designed to shut off the gas control valve/thermostat in the event the water heater has poor combustion caused by a blocked vent or insufficient combustion air. If the switch opens, check the flame-trap for signs of high temperature (blue or black discoloration), and inspect your installation for any problems with venting or combustion air (See Troubleshooting Flowchart on page 29). Reset the thermal switch by depressing the small button in the center of the switch.
IMPORTANT: Correct any issues prior to resetting the switch. Contact the Product Service and Support Department for service information at: 1-800-365-4054.

A temperature limit switch or ECO (Energy Cut Off) sensor located in the gas control valve\thermostat, is used to shut off the water heater if the water temperature exceeds 189°F (87°C).

The Diagnostic Status Light will flash a code indicating an “Overheat Failure” (4 Flashes). See “Operating the Temperature Control System.” If the gas control valve/thermostat has an “ECO Lockout” the gas control valve/thermostat must be replaced by a qualified person. Contact your local dealer for service information.

Anode Rod/Water Odor

Each water heater contains at least one anode rod, which will slowly deplete while protecting the glass-lined tank from corrosion and prolonging the life of the water heater. Once the anode is depleted, the tank will start to corrode, eventually developing a leak. Certain water conditions will cause a reaction between this rod and the water. The most common complaint associated with the anode rod is a “rotten egg smell” produced from the presence of hydrogen sulfide gas dissolved in the water. IMPORTANT: Do not remove this rod permanently as it will void any warranties. The parts list includes a special anode that can be ordered if water odor or discoloration occurs. NOTE: This rod may reduce but not eliminate water odor problems. The water supply system may require special aeration or chlorination equipment from a water conditioning company to successfully eliminate all water odor problems.

The use of a water softener may decrease the life of the water heater tank.

The anode rod should be removed from the water heater tank every 3 years for inspection. The following are typical (but not all) signs of a depleted anode rod:

- The majority of the rods diameter is less than 3/8”.
- Significant sections of the support wire (approx. 1/3 or more of the anode rod’s length) are visible.

If the anode rod shows signs of either or both it should be replaced. NOTE: Whether reinstalling or replacing the anode rod, check for any leaks and immediately correct if found.

In replacing the anode:

1. Turn off gas supply to the water heater.
2. Shut off the water supply and open a nearby hot water faucet to depressurize the water tank.
3. Drain approximately 5 gallons of water from tank (Refer to the “Draining and Flushing” section for proper procedures). Close drain valve.
4. Remove old anode rod.
5. Use Teflon® tape or approved pipe sealant on threads and install new anode rod.
6. Turn on water supply and open nearby hot water faucet to purge air from water system. Check for any leaks and immediately correct any if found.
7. Restart the water heater as directed under the “Operating Your Water Heater.” See the “Repair Parts Illustration” section for anode rod location.

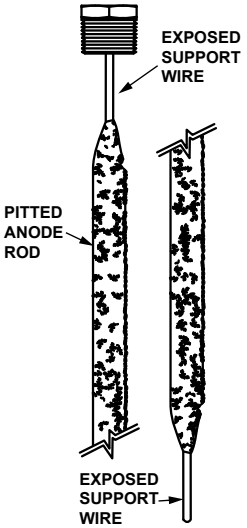


FIGURE 24.

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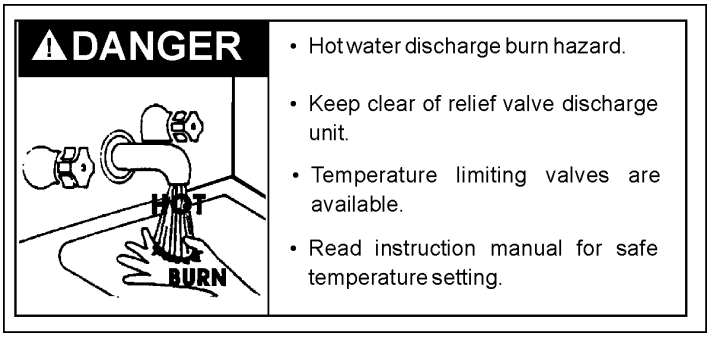
Draining and Flushing


DANGER
• Hot water discharge burn hazard.
• Keep clear of relief valve discharge unit.
• Temperature limiting valves are available.
• Read instruction manual for safe temperature setting.
HOT
BURN

It is recommended that the tank be drained and flushed every 6 months to remove sediment which may build up during operation. The water heater should be drained if being shut down during freezing temperatures. To drain the tank, perform the following steps:

1. Turn off the gas to the water heater at the manual gas shut-off valve.
1. Move the switch on the gas control valve/thermostat to the “OFF” position to turn off the water heater.
2. Open a nearby hot water faucet until the water is no longer hot.
3. Close the cold water inlet valve.
4. Connect a hose to the drain valve and terminate it to an adequate drain or external to the building.
5. Open the water heater drain valve and allow all of the water to drain from the tank. Flush the tank with water as needed to remove sediment.
6. Close the drain valve, refill the tank, and restart the heater as directed in this manual.

If the water heater is going to be shut down for an extended period, the drain valve should be left open.

IMPORTANT: Condensation may occur when refilling the tank and should not be confused with a tank leak..

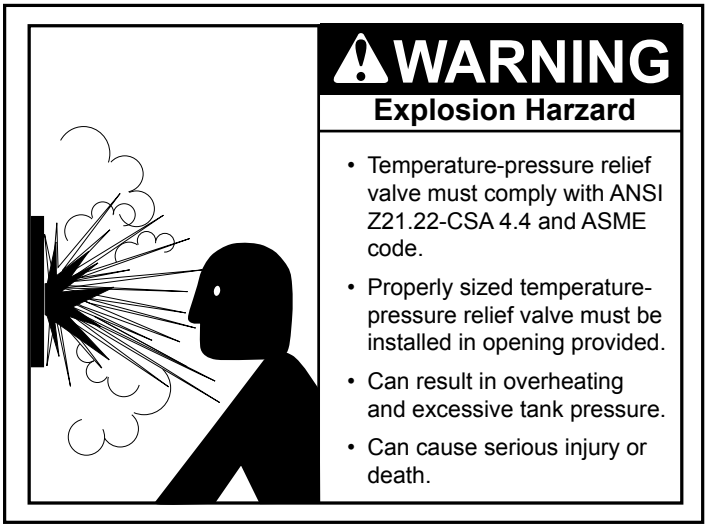
Routine Preventive Maintenance

At least annually, a visual inspection should be made of the venting and air supply system, piping systems, main burner, pilot burner, and flame-arrestor. Check the water heater for the following:

- Obstructions, damage, or deterioration in the venting system. Make sure the ventilation and combustion air supplies are not obstructed.
- Clean any dust or debris from the base-ring filter.
- Soot and/or carbon on the main burner and pilot burner. Contact a qualified technician.
- Leaking or damaged water and gas piping.
- Presence of flammable or corrosive materials in the installation area.
- Presence of combustible materials near the water heater.
- After servicing this water heater, check to make sure it is working properly. (See “Operating Your Water Heater” section of this manual.)

IMPORTANT: If you lack the necessary skills required to properly perform this visual inspection, you should not proceed, but get help from a qualified technician.

Temperature and Pressure Relief Valve


WARNING
Explosion Harzard
• Temperature-pressure relief valve must comply with ANSI Z21.22-CSA 4.4 and ASME code.
• Properly sized temperature-pressure relief valve must be installed in opening provided.
• Can result in overheating and excessive tank pressure.
• Can cause serious injury or death.

Manually operate the temperature and pressure relief valve at least once a year to make sure it is working properly. To prevent water damage, the valve must be properly connected to a discharge line which terminates at an adequate drain. Standing clear of the outlet (discharged water may be hot), slowly lift and release the lever handle on the temperature and pressure relief valve to allow the valve to operate freely and return to its closed position. See Figure 25. If the valve fails to completely reset and continues to release water, immediately shut off the manual gas control valve and the cold water inlet valve and call a qualified technician.

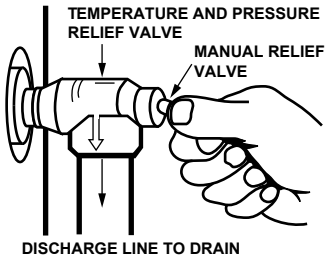


FIGURE 25.

MAINTENANCE OF YOUR WATER HEATER

Replacement Parts

IMPORTANT: The following maintenance procedures are for the FVIR System components and should be performed by a qualified technician.

Replacement parts may be ordered through your plumber or the local distributor. Parts will be shipped at prevailing prices and billed accordingly. When ordering replacement parts, always have the following information ready:

1. model, serial, and product number
2. type of gas
3. item number
4. parts description

See Repair Parts Section for a list of available repair parts.

Removing the Manifold/Burner Assembly

1. Turn off the gas to the water heater at the manual shut-off valve (Figure 5).
2. Move the ON/OFF switch on the gas control valve/ thermostat to the “OFF” position to turn off the water heater. (Figure 26).

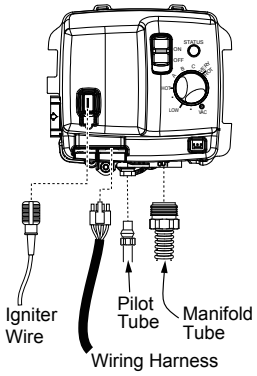


FIGURE 26.

3. Remove the outer door.
4. Remove the two screws (1/4” nut driver) securing the manifold door assembly to the combustion chamber (Figure 27).

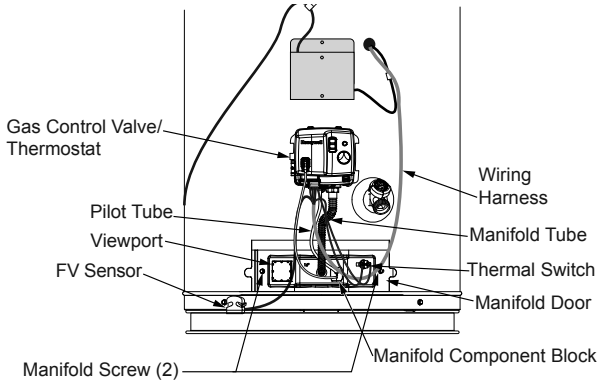


FIGURE 27.

5. Disconnect the pilot tube (7/16” wrench), the igniter wire, and manifold tube (3/4” wrench) at the gas control valve/thermostat. Also use needle nose pliers to disconnect the yellow TCO wire leads from the thermal switch on the manifold door. **NOTE:** L.P. Gas systems use reverse (left-hand) threads on the manifold tube.
6. Grasp the manifold tube and push down slightly to free the manifold and pilot tube.
7. Carefully remove the manifold assembly from the burner compartment.

   NOTE: Be sure not to damage internal parts.

Removing the Burner from the Manifold/ Burner Assembly

Natural Gas (Low Nox) & L.P. Gas Burner

1. Take off the burner by removing the two (2) screws located underneath the burner.
2. Check the burner to see if it is dirty or clogged. The burner may be cleaned with soap and hot water (Figure 28).

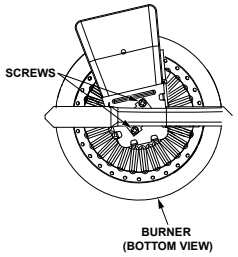


FIGURE 28.

Replacing the Pilot/Igniter - Flame Sensor Assembly

1. Remove the manifold assembly as directed previously.
2. Lift the retainer clip straight up from the back of the manifold component block (using a flat-blade screwdriver), then remove the manifold component block from the manifold door (Figure 37).
3. Using a 7/16" wrench, loosen the nut securing the pilot tube to the pilot assembly.
   NOTE: To prevent any bending of the pilot bracket, use pliers to hold the pilot assembly bracket while loosening the pilot nut.

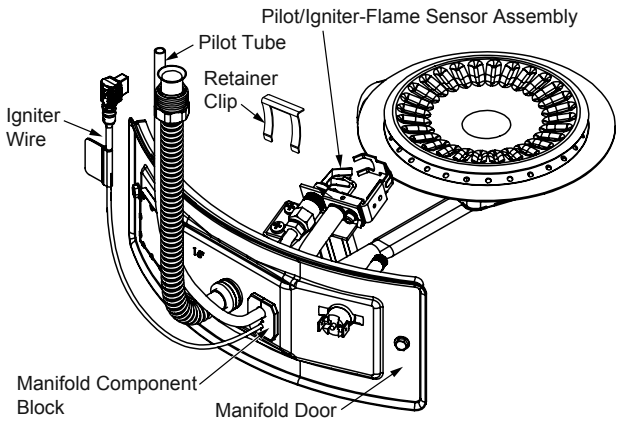


FIGURE 29.

4. Pull the pilot tube from the pilot assembly (Figure 30).**IMPORTANT:** Be careful not to bend or alter the position of the pilot assembly components.
5. Use a screwdriver to remove the screws securing the Pilot/Igniter - Flame Sensor Assembly. Keep the screws for reattachement.
6. Using the old pilot/pilot tube assembly as a guide, bend the new pilot tube to match the old one. Make only the bends closest to the pilot before going to the next step.

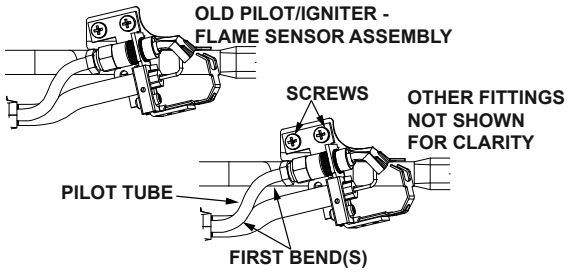


FIGURE 30.

7. Push the new pilot tube and igniter wire through the hole in the manifold door (See Figure 31). Reconnect the pilot tube and tighten the nut securing it to the pilot assembly.
   IMPORTANT: Keep the pilot orifice in the pilot when making the connection. DO NOT operate the water heater without the pilot orifice installed. Reattach the pilot assembly to the manifold.
8. Be sure the igniter wire is positioned through the bottom opening of the manifold component block. See "Replacing Manifold Assembly" section.

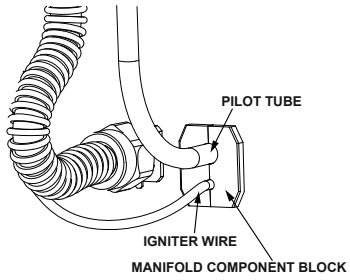


FIGURE 31.

External Inspection & Cleaning of the Base-Ring Filter

1. At least annually check the base-ring filter (Figure 32) for any dust or debris that may have accumulated on the filter screen. NOTE: If the water heater is located in an area that is subjected to lint and dirt, it may be necessary to check the base-ring filter more frequently.
2. Follow the Lighting Instructions to turn off the water heater and allow it to cool for 10 minutes before attempting to clean the base-ring filter.
3. Use a vacuum cleaner with a hose attachment to remove any dust or debris that may have accumulated on the filter. NOTE: If unable to inspect or clean the base-ring filter, follow the "Cleaning the Combustion Chamber and Flame-arrestor" instructions.
4. After the base-ring filter has been cleaned, follow the Lighting Instructions to return the water heater to service.

Cleaning the Combustion Chamber and Flame-arrestor

1. Follow procedure outlined in “Removing the Manifold/ Burner Assembly”.
2. Use a vacuum cleaner/shop vac to remove all loose debris in the combustion chamber (Figure 32). Use compressed air to clear any dust or debris that may have accumulated in the flame-arrestor.

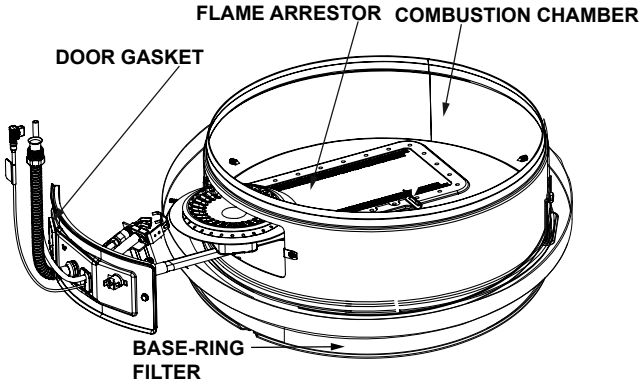


FIGURE 32.

3. Reassemble following the procedure under “Replacing the Manifold/Burner Assembly”.

Replacing the Manifold/Burner Assembly

⚠WARNING

Explosion Hazard

- **Tighten both manifold door screws securely.**
- **Remove any fiberglass between gasket and combustion chamber.**
- **Replace viewport if glass is missing or damaged.**
- **Replace two piece wire connector if missing or removed.**
- **Replace door gasket if damaged.**
- **Failure to follow these instructions can result in death, explosion, or fire.**

1. Check the door gasket for damage or imbedded debris prior to installation.
2. Inspect the view port for damage and replace as required.
3. Insert the manifold/burner assembly into the burner compartment, making sure that the tip of the manifold tube engages in the slot of the bracket inside the combustion chamber (Figures 33 & 34).
4. Inspect the door gasket and make sure there is no fiberglass insulation between the gasket and the combustion chamber.
5. Replace the two screws, which secure the manifold/ burner assembly door to the combustion chamber and tighten securely. Once the manifold/burner assembly door is tightened, visually inspect the door gasket between the manifold/burner assembly door and the combustion chamber for spaces or gaps that would prevent a seal. IMPORTANT: Do not operate the water heater if the door gasket does not create a seal between the manifold door and the combustion chamber.
6. During the following procedure, do not cross-thread or apply any thread sealant to any of the fittings listed below. First, reconnect the manifold tubing to the gas control valve/thermostat. NOTE: L.P. gas systems use reverse (left-hand) threads on the manifold tube.

   NOTE: If a ferrule nut needs to be installed for the pilot tube, locate the one provided with your parts kit. Install it in the gas control valve/thermostat at the pilot location, hand tight only.

   Next, insert the pilot tube into the ferrule nut until it bottoms out. NOTE: Hold the tube in this position. Tighten the ferrule nut with a wrench until the crimp connection seals to the pilot tube. Continue to tighten until the nut is tight in the gas control valve/thermostat. When you are finished, connect the two wire leads that go to the thermal switch.
7. Reconnect the igniter wire.
8. Turn gas supply on and refer to the Lighting Instructions.
9. With the burner lit, check the gas control valve/thermostat supply line, manifold component block, manifold tube, and pilot tube connections for leaks. Check for leaks by brushing on an approved noncorrosive leak detection solution. Bubbles forming indicate a leak. Correct any leak found. IMPORTANT: All leaks must be fixed immediately.
10. Replace the outer door.

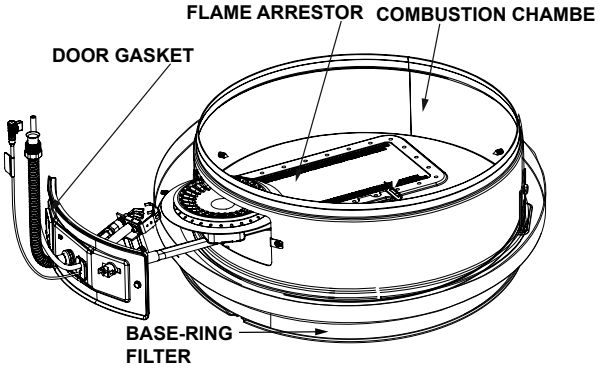


FIGURE 33.

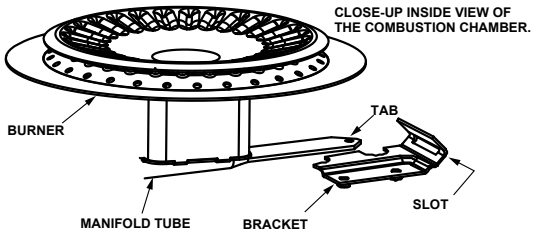


FIGURE 34.

Igniter System

The STP (Spark-to-Pilot) igniter system consists of the pilot, electrode, and wire. The pilot is ignited by an electric spark generated when the gas control valve/thermostat sends an electrical signal to the electrode. Use only factory authorized STP igniter parts for replacement.

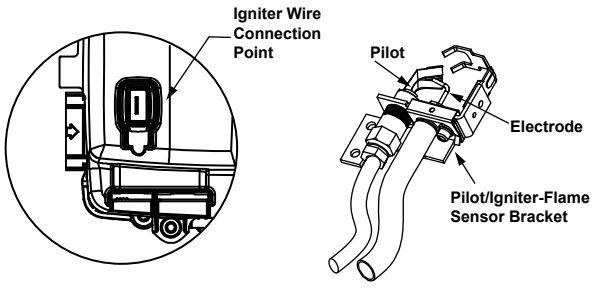


FIGURE 35.

Testing the Igniter System

Turn off the gas to the water heater at the manual gas shut-off valve. Watch the electrode tip while activating the igniter. A visible spark should jump from the electrode. To avoid shock, do not touch the burner or any metal part on the pilot or pilot assembly. If no spark is visible, check the wire connections and make sure the electrode is not broken. Replace the igniter if defective. Dirt and rust on the pilot or electrode tip can prevent the igniter spark. Wipe clean with a damp cloth and dry completely. Rust can be removed from the electrode tip and metal surfaces by lightly sanding with an emery cloth or fine grit sandpaper.

Removing and Replacing the Gas Control Valve/Thermostat

IMPORTANT: This water heater has a resettable thermal switch installed. Do not attempt to disable or modify this feature in any way. Use only factory authorized replacement parts.

Removing the Gas Valve:

1. Turn off the gas supply to the water heater at the manual gas shut-off valve. This valve is typically located beside the water heater. Note the position of the shut-off valve in the open/on position then proceed to turn it off (Figure 5).
2. Move the ON/OFF switch on the gas control valve/thermostat to the “OFF” position to turn off the water heater and unplug from the wall outlet. (Figure 27).
3. Drain the water heater. Refer to the section of “Draining and Flushing” section and follow the procedure.
5. Disconnect the wire harness, flammable vapor sensor wires, and igniter wire from the gas control valve/thermostat. Disconnect pilot tube (7/16” wrench) and manifold tube (3/4” wrench) at the gas control valve/thermostat (Figure 26). **NOTE:** L.P. Gas systems use reverse (left-hand) threads on the manifold tube
6. Refer to “Gas Piping” section (Figure 5) and disconnect the ground joint union in the gas piping. Disconnect the remaining pipe from the gas control valve/thermostat.
7. To remove the gas control valve/thermostat, thread a 4” section of pipe into the inlet and use it to turn the gas control valve/thermostat (counterclockwise.) Do not use pipe wrench or equivalent to grip body. Damage may result, causing leaks. Do not insert any sharp objects into the inlet or outlet connections.

   Damage to the gas control valve/thermostat may result.

Replacing the Gas Valve:

1. To replace the gas control valve/thermostat, reassemble in reverse order. When replacing the gas control valve/thermostat, thread a 4” section of pipe into the inlet and use it to turn the gas control valve/thermostat (clockwise.) DO NOT OVER TIGHTEN or damage may result. NOTE: Use an approved TEFLON® tape or pipe compound only on the threaded section of the gas control valve/thermostat that screws into the tank.
2. Reconnect the gas piping to the gas control valve/thermostat. NOTE: Use an approved Teflon tape or pipe compound on the gas piping connections.
3. Do not use the (pilot) ferrule nut supplied with the new gas control valve/thermostat, unless the existing nut is not usable. Reconnect the manifold tube, pilot tube, igniter wire, wiring harness, and thermal switch wires. NOTE: L.P. gas systems use reverse (left-hand) threads on the manifold tube.
4. Fill the tank completely with water. NOTE: To purge the lines of any excess air, keep the hot water faucet open for 3 minutes after a constant flow of water is obtained.
5. Turn on the gas supply and test the gas supply connections by brushing on an approved noncorrosive leak detection solution. Bubbles forming indicate a leak. Correct any leak found.
6. Check the operation of the burner by following the lighting instructions on the front of the water heater. With the burner lit, check the gas control valve/thermostat supply line, manifold tube and pilot tube connections for leaks.
7. Verify proper operation and then replace the outer door.
8. If additional information is required, contact Residential Technical Assistance by referencing the number on the water heater.

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FVIR System Operational Checklist

1. Manifold gasket properly sealed.
2. Viewport not damaged or cracked.
3. Flame-arrestor free of debris and undamaged.
4. Two piece wire connector properly installed.
5. No leaks at pilot and manifold connection.
6. Manifold door screws securely tightened.
7. Depress the button on the thermal switch

TROUBLESHOOTING CHART

PROBLEM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
BURNER WILL NOT IGNITE	1. Pilot will not light	1. See PILOT WILL NOT LIGHT OR REMAIN LIT
	2. Thermostat set too low	2. Turn temp. dial to desired temperature
	3. No gas	3. Check with gas utility company
	4. Dirt in the gas lines	4. Notify utility-install trap in gas line
	5. Pilot line clogged	5. Clean, locate source and correct
	6. Main burner line clogged	6. Clean, locate source and correct
	7. Non-functioning gas control valve/thermostat	7. Replace gas control valve/thermostat
	8. Heater installed in a confined area	8. Provide fresh air ventilation
	9. Flue Damper not functioning	9. Cycle power to the water heater off and on. If problem persists replace the flue damper
PILOT WILL NOT LIGHT OR REMAIN LIT	1. Non-functioning Pilot\Igniter-Flame Sensor	1. See Status Light Code Troubleshooting Table section
	2. The thermal switch tripped	2. See Pilot Light Troubleshooting Flowchart section
	3. Igniter wire connection loose	3. Seat connector firmly in socket
	4. Air in gas line	4. Bleed the air from the gas line
	5. Low gas pressure	5. Check with gas utility company
	6. No gas	6. Check with gas utility company
	7. Dirt in gas lines	7. Notify utility-install dirt trap in gas line
	8. Cold drafts	8. Locate source and correct
	9. Thermostat ECO switch open	9. Replace thermostat
	10. Pilot line or orifice clogged	10. Clean, locate source and correct
	11. Air for combustion obstructed	11. See maintenance section for inspection and cleaning of flame trap.
	12. FV Senor Lockout	12. Contact a qualified person to reset the sensor
	13. Flue Damper not functioning	13. Cycle power to the water heater off and on. If problem persists replace the flue damper
BURNER FLAME YELLOW-LAZY	1. Insufficient secondary air	1. Provide ventilation to water heater
	2. Low gas pressure	2. Check with gas utility company
	3. Flue clogged	3. Clean, locate source and correct
	4. Flue damper partially open	4. Cycle gas control valve/thermostat OFF then ON. If problem persists replace damper
	5. Main burner line clogged	5. Clean, locate source and correct
	6. Heater installed in a confined area	6. Proper fresh air ventilation
	7. Obstruction in main burner orifice	7. Clean or replace orifice
HIGH OPERATION COSTS	1. Thermostat set too high	1. Set temperature dial to lower setting
	2. Sediment or lime in tank	2. Drain/flush-provide water treatment if needed
	3. Water heater too small for job	3. Install adequate heater
	4. Wrong piping connections	4. Correct piping-dip tube must be in cold inlet
	5. Leaking faucets	5. Repair faucets
	6. Gas leaks	6. Check with utility-repair at once
	7. Wasted hot water	7. Advise customer
	8. Long runs of exposed piping	8. Insulate piping
	9. Hot water piping in exposed wall	9. Insulate piping
	10. Flue Damper seal not functioning	10. Replace the flue damper

INSUFFICIENT HOT WATER	1. Thermostat set too low 2. Sediment or lime in tank 3. Water heater too small 4. Wrong piping connections 5. Leaking faucets 6. Wasted hot water 7. Long runs of exposed piping 8. Hot water piping in outside wall 9. Low gas pressure	1. Turn temperature dial to desired setting 2. Drain/flush-provide water treatment if needed 3. Install adequate heater 4. Correct piping-dip tube must be in cold inlet 5 Repair faucets 6. Advise customer 7. Insulate piping 8. Insulate piping 9. Check with gas utility company
SLOW HOT WATER RECOVERY	1. Insufficient secondary air 2. Flue clogged 3. Low gas pressure 4. Improper calibration 5. Water heater too small 6. Wasted hot water	1. Provide ventilation to water heater. Check flue way, flue baffle, and burner 2. Clean flue, locate source and correct 3. Check with gas utility company 4. Replace thermostat 5. Install adequate heater 6. Advise customer
DRIP FROM RELIEF VALVE	1. Excessive water pressure 2. Heater stacking 3. Closed water system	1. Use a pressure reducing valve and relief valve 2. Lower the thermostat setting 3. See “Closed System/Thermal Expansion”
THERMOSTAT FAILS TO SHUT-OFF	1. Thermostat not functioning properly 2. Improper calibration	1. Replace thermostat 2. Replace thermostat
COMBUSTION ODORS	1. Insufficient secondary air 2. Flue clogged 3. Heater installed in a confined area	1. Provide ventilation to water heater. Check flue way, flue baffle, and burner 2. Clean, locate source and correct 3. Provide fresh air ventilation
SMOKING AND CARBON FORMATION (SOOTING)	1. Insufficient secondary air 2. Low gas pressure 3. Flue clogged 4. Thermostat not functioning properly 5. Heater installed in a confined area 6. Burner flame yellow-lazy	1. Provide ventilation to water heater. Check flue way, flue baffle, burner 2. Check with gas utility company 3. Clean, locate source and correct 4. Replace thermostat 5. Provide fresh air ventilation 6. See “Burner Flame Yellow-Lazy”
CONDENSATION	1. Temperature setting too low	1. Increase the temperature setting
BURNER FLAME FLOATS AND LIFTS OFF PORTS	1. Orifice too large 2. High gas pressure 3. Flue clogged 4. Cold drafts	1. Replace with correct orifice 2. Check with gas utility company 3. Clean flue and burner-locate source and correct 4. Locate source and correct
BURNER FLAME TOO HIGH	1. Orifice too large	1. Replace with correct orifice
FLAME BURNS AT ORIFICE	1. Thermostat not functioning properly 2. Low gas pressure	1. Replace thermostat 2. Check with gas utility company
PILOT FLAME TOO SMALL	1. Pilot line or orifice clogged 2. Low gas pressure	1. Clean, locate source and correct 2. Check with gas utility company
SMELLY WATER	1. Sulfides in the water	1. Replace the anode with a special anode

STATUS LIGHT TROUBLESHOOTING FLOWCHART

Status Light Code

LED FLASH SEQUENCE	CONTROL STATUS	CORRECTIVE ACTION
Short flash once every four second	IDLE (No call for heat, no fault conditions)	
“Heartbeat”, alternates bright/dim	Call for Heat (No fault conditions)	
One Flash, three second pause	Low Flame Signal (control continues to operate)	Turn the power switch on the gas control valve to the “OFF” position and unplug the power cord from the power outlet. 1. Check the incoming gas line pressure to ensure adequate supply to the water heater. If incoming gas supply pressure is adequate proceed to step 2. 2. Check all wiring connections and insure all harness and wires connections are seated firmly and provide proper electrical contact. If no connection problems are found proceed to step 3. Firmly seat any loose connections found. If any connections are found to be damaged consult the replacement parts list for the appropriate replacement. After any connection problems are fixed restart the water heater by following the lighting instructions on page 19. If the problem persists proceed to step 3. 3. Check condition of the base ring filter and flame arrestor. If they are clogged follow the instructions for cleaning on pages 26-27. If parts are not clogged proceed to step 4. After cleaning follow instructions for lighting on page 19. If problem persists proceed to step 4. 4. Follow the instructions on page 25 to remove the burner assembly. Once the burner assembly has been removed inspect the manifold tube and burner, see figure 29, for any obstructions. If any clogs or obstructions are present clear them. Inspect the electrode/flame sense rod, see figure 43, for corrosion buildup, degradation, or damage. If there is evidence of any damage to the electrode/ flame sense rod replace the igniter/pilot assembly. Follow the directions on page 27 to re-install the burner assembly into the combustion chamber. Follow the instructions for lighting on page 19. If the problem persists contact a certified service representative.
Two Flash, three second pause	End Switch Failed Closed	Look at the top of water heater to see if the damper is open, see figure 12. If the damper is open insure there is no obstruction that would prevent the damper from closing. If there are any obstructions turn the power switch on the gas valve to the “OFF” position, remove the obstruction, if the damper closes turn the power switch on the gas valve to the “ON” position. If there are no obstructions present turn the power switch on the gas valve to the “OFF” position. Observe the damper to see if the damper closes. If the damper does not close unplug the power cord from the power outlet and proceed to step 1. If the damper closes turn the power switch on the gas valve to the “ON” position. 1. Check all wiring connections to insure all harness and wire connections are seated firmly and provide proper electrical contact. If no connection problems are found replace the damper. Firmly seat any loose connections found. If any connections are found to be damaged consult the replacement parts list on pages 34-35 for the appropriate replacement. After any connection problems are fixed restart the water heater by following the lighting instructions on page 19. If the problem persists replace the damper.
Three Flash, three second pause	End Switch Failed Open or TCO Limit Lockout	Turn the power switch on the gas control valve to the “OFF” position and unplug the power cord from the power outlet. 1. Attempt to depress the TCO door switch button, see figure 27. If the TCO door switch button depresses follow the instructions for cleaning the filter and flame arrestor on page 24. After cleaning is completed follow the lighting instructions on page 19. If the TCO door switch button does not depress proceed to step 2. 2. Follow the lighting instructions on page 19. Observe the damper during initial startup. If there is a call for heat and the damper opens allow the unit to continue to perform and monitor any change in status. If there is a call for heat and the damper does not open proceed to step 3. 3. Check all wiring connections to insure all harness and wire connections are seated firmly and provide proper electrical contact. If no connection problems are found replace the damper. Firmly seat any loose connections found. If any connections are found to be damaged consult the replacement parts list on page 34-35 for the appropriate replacement. After any connection problems are fixed restart the water heater by following the lighting instructions on page 19. If the problem persists replace the damper.
Four Flash, three second pause	ECO Limit Lockout	1. Turn the power switch on the gas control valve to the “OFF” position, wait 10-20 seconds then turn the power switch on the gas control valve to the “ON” position. If the problem persists replace the gas control valve.
Five Flash, three second pause	Flame Out of Sequence	Turn the power switch on the gas control valve to the “OFF” position. Wait 10 minutes then follow the lighting instructions on page 19. If the problem persists replace the gas control valve.
Six-One Flash, three second pause	Soft Lockout* - Retry Limit - Failed TFI (Trial for Ignition)	Turn the power switch on the gas control valve to the “OFF” position and unplug the power cord from the power outlet. 1. Check the incoming gas line pressure to ensure adequate supply to the water heater. If incoming gas supply pressure is adequate proceed to step 2. 2. Check all wiring connections and insure all harness and wires connections are seated firmly and provide proper electrical contact. If no connection problems are found proceed to step 3. Firmly seat any loose connections found. If any connections are found to be damaged consult the replacement parts list for the appropriate replacement. After any connection problems are fixed restart the water heater by following the lighting instructions on page 19. If the problem persists proceed to step 3. 3. Check condition of the base ring filter and flame arrestor. If they are clogged follow the instructions for cleaning on pages 26-27. If parts are not clogged proceed to step 4. After cleaning follow instructions for lighting on page 19. If problem persists proceed to step 4. 4. Follow the instructions on page 25 to remove the burner assembly. Once the burner assembly has been removed inspect the manifold tube and burner, see figure 29 , for any obstructions. If any clogs or obstructions are present clear them. Inspect the electrode/flame sense rod, see figure 43 , for corrosion buildup, degradation, or damage. If there is evidence of any damage to the electrode/flame sense rod replace the igniter/pilot assembly. Follow the directions on page 27 to re-install the burner assembly into the combustion chamber. Follow the instructions for lighting on page 24. If the problem persists contact a qualified service representative.

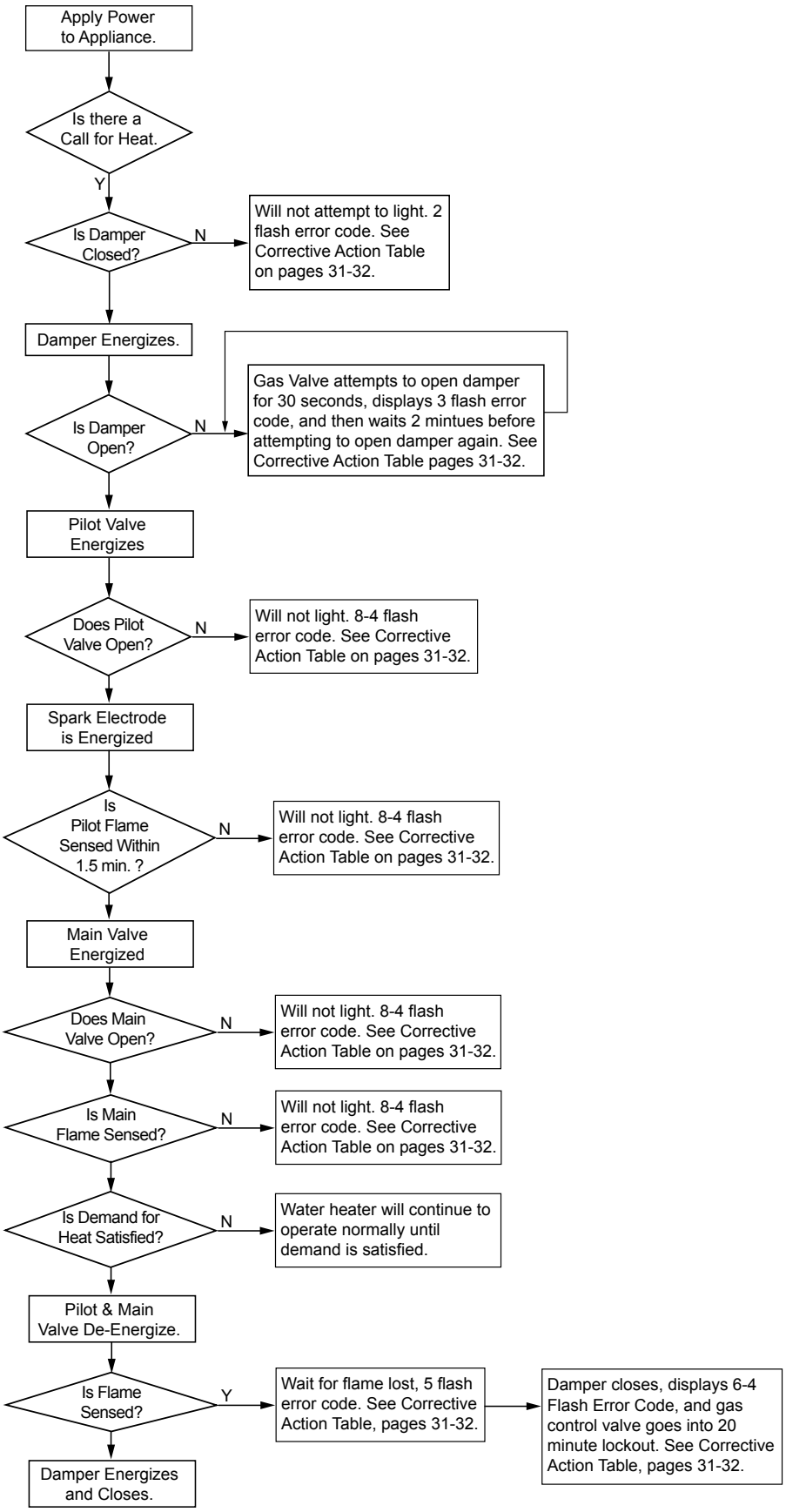
* Soft Lockout - 20 minute wait before returning to normal mode.

STATUS LIGHT TROUBLESHOOTING FLOWCHART

LED FLASH SEQUENCE	CONTROL STATUS	CORRECTIVE ACTION
Six-Two Flash, three second pause	Soft Lockout* - Recycle Limit - Flame Lost - END Switch Fails	Turn the power switch on the gas control valve to the “OFF” position and unplug the power cord from the power outlet. 1. Check all wiring connections to insure all harness and wire connections are seated firmly and provide proper electrical contact. If no connection problems are found replace the damper. Firmly seat any loose connections found. If any connections are found to be damaged consult the replacement parts list on pages 34-35 for the appropriate replacement. After any connection problems are fixed restart the water heater by following the lighting instructions on page 19. If the problem persists replace the damper.
Six-Three Flash, three second pause	Soft Lockout* - Recycle Limit - Flame Lost	Turn the power switch on the gas control valve to the “OFF” position and unplug the power cord from the power outlet. 1. Check the incoming gas line pressure to ensure adequate supply to the water heater. If incoming gas supply pressure is adequate proceed to step 2. 2. Check all wiring connections and insure all harness and wires connections are seated firmly and provide proper electrical contact. If no connection problems are found proceed to step 3. Firmly seat any loose connections found. If any connections are found to be damaged consult the replacement parts list for the appropriate replacement. After any connection problems are fixed restart the water heater by following the lighting instructions on page 19. If the problem persists proceed to step 3. 3. Check condition of the base ring filter and flame arrestor. If they are clogged follow the instructions for cleaning on pages 26-27. If parts are not clogged proceed to step 4. After cleaning follow instructions for lighting on page 19. If problem persists proceed to step 4. 4. Follow the instructions on page 25 to remove the burner assembly. Once the burner assembly has been removed inspect the manifold tube and burner, see figure 29 , for any obstructions. If any clogs or obstructions are present clear them. Inspect the electrode/flame sense rod, see figure 43 , for corrosion buildup, degradation, or damage. If there is evidence of any damage to the electrode/flame sense rod replace the igniter/pilot assembly. Follow the directions on page 27 to re-install the burner assembly into the combustion chamber. Follow the instructions for lighting on page 19. If the problem persists contact a qualified service representative.
Six-Four Flash, three second pause	Soft Lockout* - Flame out of Sequence Sensed	Turn the power switch on the gas control valve to the “OFF” position and unplug the power cord from the power outlet. Wait 10 minutes then follow the lighting instructions on page 19. If the problem persists replace the gas control valve.
Seven Flash, three second pause	Flammable Vapor Sensor (FVS) Lockout	1. Do not touch any electrical switch, do not use any phone in the building and do not try to light any appliance. 2. Smell around the water heater to ensure there are no gas leaks at the gas control valve or in the supply gas line or for any other type of flammable vapors in the area. 3. Carefully inspect the area surrounding the water heater for any substances such as gasoline, paint, paint thinners, varnish, or cleaners that could emit flammable vapors. Remove anything that can potentially emit flammable vapors from the area and store it properly in a different location. 4. Contact a qualified service representative for inspection and/or replacement of the FV sensor.
Eight-One Flash, three second pause	Flammable Vapor Sensor (FVS) Fault Detected	Turn the power switch on the gas control valve to the “OFF” position, wait 10-20 seconds then turn the power switch on the gas control valve to the “ON” position. If the problem persists replace the gas valve.
Eight-Two Flash, three second pause	Temperature Sensor Fault Detected	Turn the power switch on the gas control valve to the “OFF” position, wait 10-20 seconds then turn the power switch on the gas control valve to the “ON” position. If the problem persists replace the gas valve.
Eight-Three Flash, three second pause	Electronic Fault Detected	Turn the power switch on the gas control valve to the “OFF” position, wait 10-20 seconds then turn the power switch on the gas control valve to the “ON” position. If the problem persists replace the gas valve.
Eight-Four Flash, three second pause	Gas Control Valve/Thermostat Fault Detected	Turn the power switch on the gas control valve to the “OFF” position, wait 10-20 seconds then turn the power switch on the gas control valve to the “ON” position. If the problem persists replace the gas valve.

* Soft Lockout - 20 minute wait before returning to normal mode.

SEQUENCE OF OPERATION CHART


Apply Power to Appliance.
Is there a Call for Heat.
Y
Is Damper Closed?
N
Will not attempt to light. 2 flash error code. See Corrective Action Table on pages 31-32.
Damper Energizes.
Is Damper Open?
N
Gas Valve attempts to open damper for 30 seconds, displays 3 flash error code, and then waits 2 mintues before attempting to open damper again. See Corrective Action Table pages 31-32.
Pilot Valve Energizes
Does Pilot Valve Open?
N
Will not light. 8-4 flash error code. See Corrective Action Table on pages 31-32.
Spark Electrode is Energized
Is Pilot Flame Sensed Within 1.5 min. ?
N
Will not light. 8-4 flash error code. See Corrective Action Table on pages 31-32.
Main Valve Energized
Does Main Valve Open?
N
Will not light. 8-4 flash error code. See Corrective Action Table on pages 31-32.
Is Main Flame Sensed?
N
Will not light. 8-4 flash error code. See Corrective Action Table on pages 31-32.
Is Demand for Heat Satisfied?
N
Water heater will continue to operate normally until demand is satisfied.
Pilot & Main Valve De-Energize.
Is Flame Sensed?
Y
Wait for flame lost, 5 flash error code. See Corrective Action Table, pages 31-32.
Damper closes, displays 6-4 Flash Error Code, and gas control valve goes into 20 minute lockout. See Corrective Action Table, pages 31-32.
Damper Energizes and Closes.

REPAIR PARTS ILLUSTRATION

When ordering repair parts always give the following information:

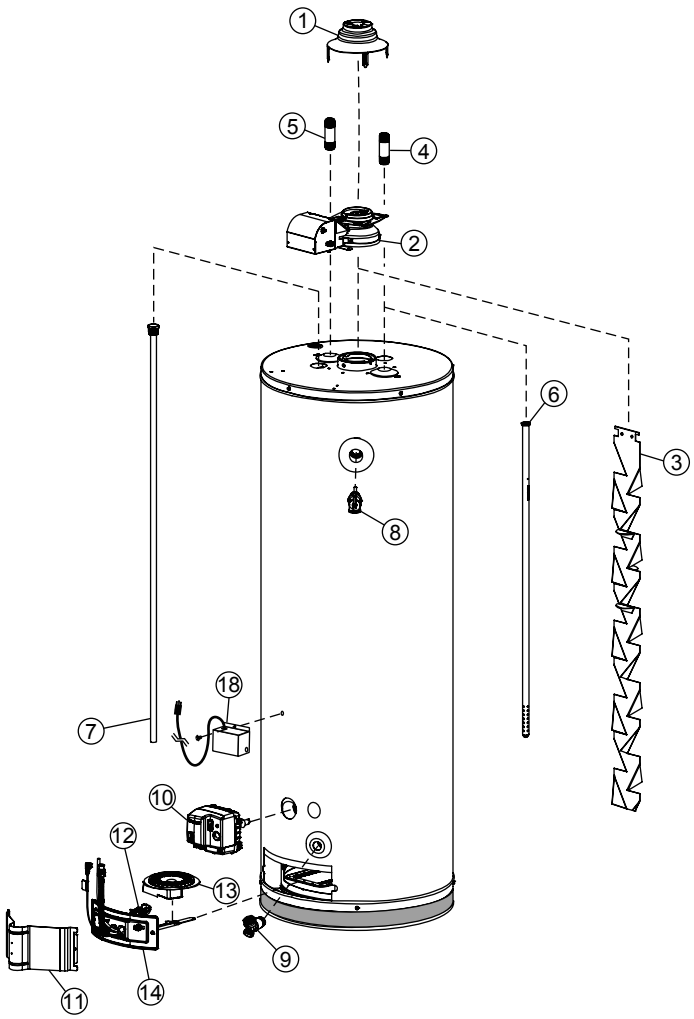
1. Model, serial, and product number
2. Type of gas
3. Item number
4. Parts description

Repair Parts List

Item No.	Parts Description	
1	DRAFT HOOD	
2	FLUE DAMPER	
3	FLUE BAFFLE	
4	HEAT TRAP (COLD) - SOME MODELS	
5	HEAT TRAP (HOT) - SOME MODELS	
6	COLD WATER DIP TUBE	
7	ANODE ROD	▲
8	TEMPERATURE & PRESSURE RELIEF VALVE (LOCATED ON SIDE)	■
9	DRAIN VALVE	
10	GAS CONTROL VALVE/THERMOSTAT	★
11	OUTER DOOR	★
12A*	STP (SPARK TO PILOT) PILOT ASSEMBLY KIT	★
12B*	STP (SPARK TO PILOT) PILOT ASSEMBLY KIT (L.P.)	★
13A*	BURNER (Natural Gas/Low Nox)	★
13B*	BURNER (L.P.)	★
14A*	BURNER ASSEMBLY	★
14B*	BURNER ASSEMBLY (L.P. Burner)	★
15*	MANIFOLD COMPONENT BLOCK	
16*	MANIFOLD DOOR GASKET	★
17*	VIEWPORT ASSEMBLY	
18**	TRANSFORMER ASSEMBLY KIT	

*Pictured on next page.

** Not shown.



LEGEND

▲ Special anode rod (see Anode Rod/Water Odor section)

■ Temperature and Pressure Relief Valve is required, but may not be factory installed

★ Unique: FVIR System parts

Listed Parts Kits and Illustrations

Item 12A: Pilot/Igniter-Flame Sensor assembly kit, which contains the pilot, igniter-flame sensor, and retainer clip (Natural Gas)

Item 12B: Pilot/Igniter-Flame Sensor assembly kit, which contains the pilot, igniter-flame sensor, and retainer clip (L.P. Gas)

Item 13A: Burner (Natural Gas/L.P. Gas)

Item 13B: Burner (L.P. Gas)

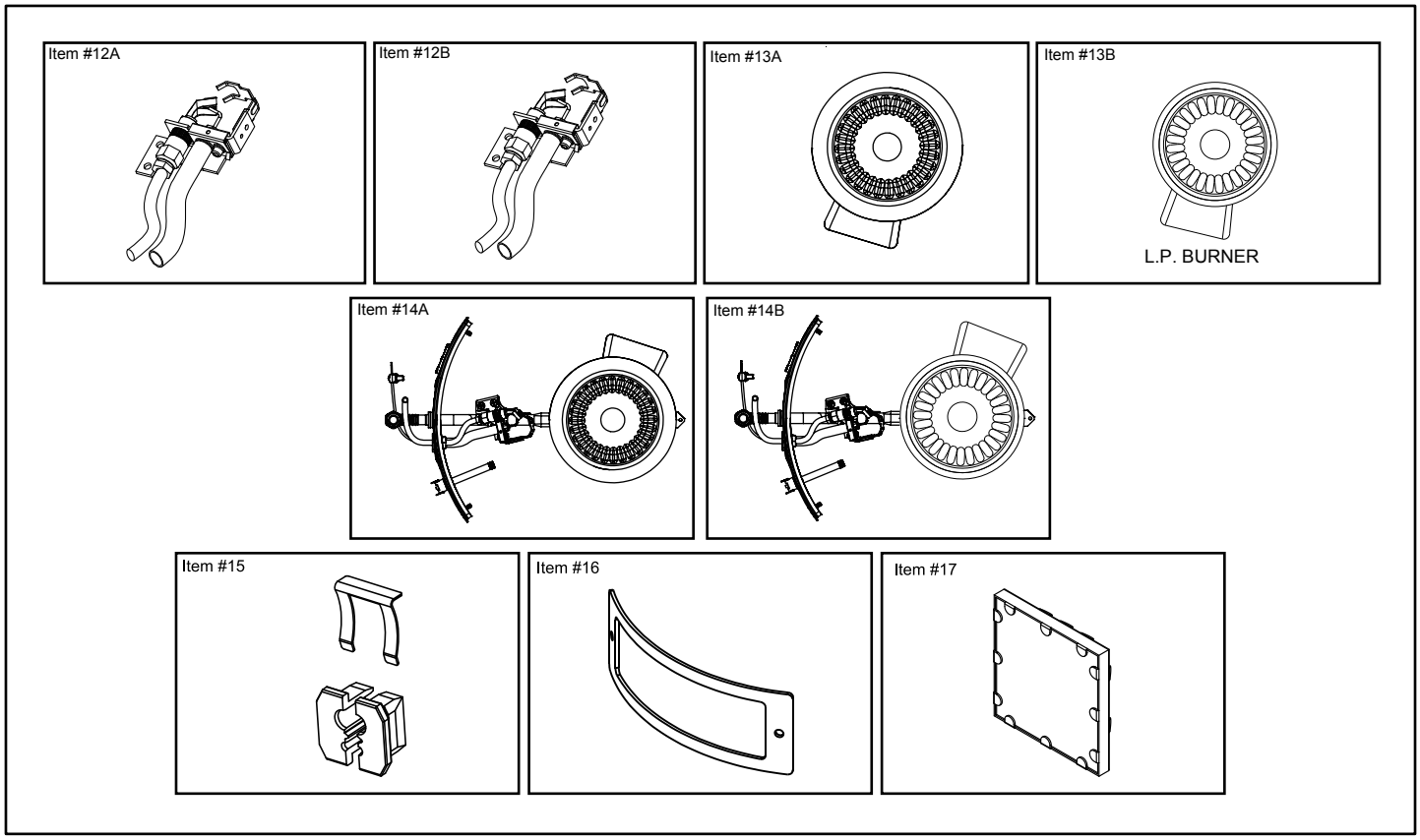
Item 14A: Manifold door assembly which contains the manifold tube, gasket, door, pilot\igniter-flame sensor assembly, manifold component block with retainer clip, thermal switch, and pilot tube. (Natural Gas/Low Nox)

Item 14B: Manifold door assembly which contains the manifold tube, gasket, door, pilot\igniter-flame sensor assembly, manifold component block with retainer clip, thermal switch, and pilot tube. (L.P. Gas)

Item 15: Contains manifold component block and retainer clip

Item 16: Contains manifold door gasket

Item 17: Contains viewport



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RELIANCE
WATER HEATER COMPANY

RESIDENTIAL GAS WARRANTY

THIS WARRANTY IS APPLICABLE TO THE ORIGINAL OWNER ONLY in accordance with the warranty terms and conditions specified below.

Reliance Water Heater Company (the warrantor) will furnish the ORIGINAL OWNER, 1) a replacement Reliance water heater of equivalent size and current model if the glasslined tank in this water heater leaks and, 2) a replacement part for any component part which fails.

THE RELIANCE WATER HEATER COMPANY REPLACEMENT MODEL OR PART WILL BE WARRANTED FOR ONLY THE UNEXPIRED PORTION OF THE ORIGINAL WARRANTY. The warranty period will be determined by the original date of purchase of the water heater, or in the absence of a Bill of Sale verifying said date, from the date of manufacture indicated on rating plate affixed to this water heater. This warranty is not transferrable and applies to models listed below:

MODEL SERIES:	Tank	Parts	Labor
909	9-year	9-year	1-year
616	6-year	6-year	1-year

When the water heater has been used for other than single family residential application;

1. The tank warranty shall be reduced to 1 year for 6 and 8 year models and to 3 years for 9 and 12 year models.

2. The parts warranty shall be reduced to 1 year for all models.

CONDITIONS AND EXCEPTIONS

This warranty shall apply only when the water heater is installed and operated in accordance with 1) all local fire codes and plumbing codes, ordinances and regulations, 2) the printed instructions provided with it, 3) good industry practices, and 4) proper safety practices such as but not limited to a properly sized drain pan piped to an adequate drain if installed in an area where leakage from the tank or its connections would result in damage to the area adjacent to the heater. In addition, a new temperature and pressure relief valve, certified by the Canadian Gas Association must have been properly installed and piped to the nearest drain.

This warranty shall apply only when the heater is:
- owned by the original purchaser;
- installed for indoor operation only;
- used at temperatures not exceeding the maximum calibrated setting of its thermostat;
- used at water pressure not exceeding the working pressure shown on the heater;
- filled with potable water, free to circulate at all times and with the tank free of damaging water sediment or scale deposits;
- used in a non-corrosive and non-contaminated atmosphere;
- used with factory approved anode(s) installed;
- in its original installation location;
- in the United States, its territories or possessions, and Canada;
- sized in accordance with proper sizing techniques for residential water heaters;
- bearing a rating plate which has not been altered, defaced or removed except as required by the warrantor;
- used in an open system or in a closed system with a properly sized and installed thermal expansion tank;
- operated with properly installed drip leg in the gas supply line;
- fired with the fuel for which it was factory built;
- fired at the factory rated input;
- operated with the inner and outer combustion chamber doors in place and all factory seals to combustion chamber intact.

Any accident to the water heater or any part thereof (including freezing, fire, floods, or lightning), any misuse, abuse or alteration of it, any operation of it in a modified form, any operation of the water heater on desalinated (deionized) water, or any damage caused by attempts to repair tank leaks or parts, will void this warranty. This warranty does not cover water heaters replaced for cosmetic reasons or for reasons of noise, taste, odor, discolored and/or rusty water. This warranty does not apply to water heaters used to heat pools, whirlpools or hot tubs or used for space heating where its sizing does not conform with specifications of the heating component manufacturer.

This warranty gives you specific legal rights, and you may have other rights which vary under the laws of each state. If any provision of this warranty is prohibited or invalid under applicable state law, that provision shall be ineffective to the extent of the prohibition or invalidity without invalidating the remainder of the affected provision or the other provisions of this warranty.

SERVICE AND LABOR RESPONSIBILITY

UNDER THIS LIMITED WARRANTY, THE WARRANTOR WILL PROVIDE ONLY A REPLACEMENT WATER HEATER OR PART THEREOF. THE OWNER IS RESPONSIBLE FOR ALL OTHER COSTS. Such costs may include but are not limited to:

a. Labor charges for service, removal, or reinstallation of the water heater or part thereof.

b. Shipping and delivery charges for forwarding the new water heater or replacement part from the nearest distributor and returning the claimed defective heater or part to such distributor.

c. All cost necessary or incidental for handling and

administrative charges, and for any materials and/or permits required for installation of the replacement heater or part.

LIMITATION ON IMPLIED WARRANTIES

Implied warranties, including any warranty of merchantability imposed on the sale of this heater under state law are limited to one year duration for the heater or any of its parts. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

CLAIM PROCEDURE

Any claim under this warranty should be initiated by contacting:

Reliance Water Heater Company
500 Tennessee Waltz Parkway
Ashland City, Tennessee 37015.
Phone: 1-800-365-4054

Replacement Parts may be ordered through authorized servicers or retailers or by contacting:

Reliance Water Heater Company
500 Tennessee Waltz Parkway
Ashland City, Tennessee 37015.
Phone: 1-800-821-2017

The warrantor will only honor replacement with identical or similar water heater or parts thereof, which are manufactured by the warrantor.

DISCLAIMERS

NO EXPRESS WARRANTY HAS BEEN OR WILL BE MADE IN BEHALF OF THE WARRANTOR WITH RESPECT TO THE MERCHANTABILITY OF THE HEATER OR THE INSTALLATION, OPERATION, REPAIR OR REPLACEMENT OF THE HEATER OR PARTS. THE WARRANTOR SHALL NOT BE RESPONSIBLE FOR WATER DAMAGE, LOSS OF USE OF THE UNIT, INCONVENIENCE, LOSS OR DAMAGE TO PERSONAL PROPERTY, OR OTHER CONSEQUENTIAL DAMAGE. THE WARRANTOR SHALL NOT BE LIABLE BY VIRTUE OF THIS WARRANTY OR OTHERWISE FOR DAMAGE TO ANY PERSONS OR PROPERTY, WHETHER DIRECT OR INDIRECT, AND WHETHER ARISING IN CONTRACT OR IN TORT. IF THE GLASS-LINED TANK IN THIS WATER HEATER SHALL PROVE UPON EXAMINATION BY THE WARRANTOR TO HAVE LEAKED DUE TO NATURAL CORROSION FROM POTABLE WATER THEREIN, DURING THE STATED WARRANTY PERIOD, THE WARRANTOR WILL SUPPLY A COMPLETE NEW RELIANCE WATER HEATER OF EQUIVALENT SIZE AND CURRENT MODEL. SHOULD GOVERNMENTAL REGULATIONS OR INDUSTRY STANDARDS PROHIBIT THE MANUFACTURER FROM FURNISHING A COMPARABLE MODEL REPLACEMENT UNDER THIS WARRANTY, THE OWNER WILL BE FURNISHED WITH THE CLOSEST COMPARABLE WATER HEATER MEETING THE THEN CURRENT GOVERNMENTAL REGULATIONS AND INDUSTRY STANDARDS. A SUPPLEMENTARY FEE MAY BE ASSESSED TO COVER THE ADDITIONAL COST ASSOCIATED WITH THE CHANGES MADE TO MEET APPLICABLE REGULATIONS AND STANDARDS.

IMPORTANT INFORMATION

Model Number _____

Serial Number _____

INSTALLATION INFORMATION

Date Installed _____

Company's Name _____

Street or P.O. Box _____

_____

City, State, and Zip Code _____

_____

Phone Number _____

Plumber's Name _____

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